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This third edition bibliography lists books and teaching aids related to aeronautics and space. Aeronautics titles are limited to aerospace-related research subjects, and books on astronomy to those directly related to space exploration. Also listed are pertinent references like pamphlets, films, film strips, booklets, charts, pictures, periodicals, and sources of information on specific space subjects available from aerospace industry companies. Reading levels for each document are indicated according to primary, intermediate, upper elementary, secondary, and adult or college. (GR)

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PREFACE

As our Nation's space program has developed, there has been a corresponding growth in educational materials to explain its purposes and activities. In the past four years the National Aeronautics and Space Administration has published two editions of the *Aeronautics and Space Bibliography* to help the general reader and especially the teacher to locate numerous books, teaching aids, films and filmstrips on space flight subjects.

The first and second editions of the bibliography, each issued in three parts, covered books published between January 1958 and April 1963. This third edition, now under one cover, includes books published in the period January 1963 through summer 1965. For the most part the books listed are written for the nonspecialist, general reader. However, a small number of selected semi-technical titles have been included for readers who wish to delve more deeply into specific space flight subjects. Aeronautics titles have been limited to aerospace-related aeronautical research subjects. Books on astronomy are limited to those that seemed most directly related to space exploration.

Asterisks by the names of the authors indicate books that were not listed in previous editions of the bibliography.

The bibliography also includes listings of pertinent references; teaching aids such as pamphlets, booklets, charts, pictures, units, and bibliographies; films; filmstrips; and a new section on space periodicals. Another new section lists sources of information on specific space subjects, available from aerospace industry companies. Requests for free materials and orders for sale items should be sent directly to the publisher or supplier as indicated. Addresses of publishers appear on pages 70 and 71.

In every case each item listed is designated by code letter as suitable for particular reading levels as follows: (P) primary, grades 1–3; (I) intermediate, grades 4–6; (U) upper elementary, grades 7–8; (S) secondary, grades 9–12; and (A) adult and college level.

Users of this bibliography are urged to consult library volumes of *The Reader's Guide to Periodical Literature* where listings of numerous articles on space flight subjects may be located in current magazines under such subject headings as: astronauts, Project Apollo, space medicine, manned space flight, spacecraft, etc.

The books and teaching aids appearing in this bibliography comprise only a partial listing and therefore this bibliography should not be considered as complete or exhaustive. The listing of any item should not be viewed as an endorsement by either the National Aeronautics and Space Administration or by the National Aerospace Education Council, compiler.

The National Aerospace Education Council acknowledges with thanks the assistance of representatives of the many publishers, organizations, government agencies, and private firms whose cooperation in compiling this bibliography was solicited and most courteously extended.

PART I • BOOKS

PART I—BOOKS

General Overview of Space Exploration

Books in this section give the reader a general, overall view of the many phases and facets of space exploration. Topics discussed include the fundamentals of space flight, rocket propulsion, unmanned spacecraft, manned space flight, tracking and telemetry systems, space medicine, the training of astronauts, and the benefits derived from the exploration of space. For books with more detailed information consult the table of contents of this bibliography. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*ALEXANDER, GEORGE. MOONPORT U.S.A. Brownell, 109 p., illus., 1964. Paperback, $1.25. A "primer" of space technology and fundamentals of space flight with a close look at Cape Kennedy and our manned and unmanned space exploration programs. (S–A)

BENDICK, JEANNE. THE FIRST BOOK OF SPACE TRAVEL. Watts, 93 p., illus., revised 1963. $2.65. Discusses rockets, missiles, satellites, space power, and space living conditions. (I)

*CHESTER, MICHAEL. ROCKETS AND SPACECRAFT OF THE WORLD. Norton, 205 p., illus., 1964. $3.95. A survey of major space programs of 12 nations, organized on a subject, rather than on a national basis. Principles of rocket propulsion, types of fuels, guidance, etc. are also discussed. (U)

*CROSBY, ALEXANDER L. THE WORLD OF ROCKETS. Random, 96 p., illus., 1965. $1.95. How rockets work. The problems and dangers of manned space flight. What we hope to learn by exploring the moon and the planets. (I)

*GATLAND, K. W., editor. SPACEFLIGHT TODAY. Aero, 254 p., illus., 1963. $7.50. A collection of articles on space flight propulsion, spacecraft, astronomy, extraterrestrial life, and space flight problems, contributed by 15 space experts. (S–A)

GEORGE, FRANCES. YOU AND SPACE. National Aerospace Education Council, 32 p., illus., revised 1964. Paperback, 50 cents. A supplementary beginning reader to build concepts of space and space travel. Includes suggested questions to stimulate discussion, understandings to be reached, and a brief bibliography. (P)

*HAGGERTY, JAMES J., JR. and JOHN H. WOODBURN. SPACECRAFT. Scholastic, approx. 160 p., revised 1965. Paperback, 50 cents. Explanations of the spacecraft program of the National Aeronautics and Space Administration—sounding probes, lunar craft and inter-planetary space flight. An extensive revision of the original book first published in 1962. This book is one of the series of Vistas of Science developed under a joint project of the National Science Teachers Association and NASA. (U–S)

HENDRICKSON, WALTER B., JR. THE STUDY OF ROCKETS, MISSILES AND SPACE MADE SIMPLE. Doubleday, 151 p., illus., 1963. Paperback, $1.45. The composition of space, how rockets operate, and a brief history of rocketry. Also includes descriptions of all major artificial satellites, space probes and experimental spacecraft launched through June, 1962, together with their missions and results. (U)

MEHRENS, H. E. THE DAWNING SPACE AGE. Civil Air Patrol, 245 p., illus., rev. 1963. Paperback, $1.50. An explanation of rocket engines, guidance and control, research by rockets, and instrumentation of rockets. Also considers manned space flight and its hazards. (S)

*MOORE, PATRICK. SPACE IN THE SIXTIES. Pelican, 218 p., 1963. Paperback, 95 cents. A summary of work being done today in space research and speculations about where it will lead. (A)

*ORDWAY, FREDERICK, I., III and RONALD C. WAKEFORD. CONQUERING THE SUN'S EMPIRE. Dutton, 128 p., illus., 1963. $3.95. An account of the achievements and unsolved difficulties in man's conquest of the solar system. Features descriptions of space vehicles for future exploration. (U)

*SILCOCK, BRYAN. PATHWAYS IN SPACE. Roy, 70 p., illus., 1964. $2.95. A brief summary, from the British viewpoint, of man in space with emphasis on the problems of navigation. (S–A)

*SONNEBORN, RUTH A. THE QUESTION AND ANSWER BOOK OF SPACE. Random, 64 p., illus., 1965. $1.95. Answers questions about space, rockets, satellites, space ships, astronauts, space stations and a trip to the moon. (P)

*TYLER, A. EDWARD. THE SPACE AROUND US. Harper, 239 p., illus., 1964. $4.95. A general overview of what space is and how we have learned about it. Covers the geography of space, natural and man-made objects, and the problems of space travel—navigation, communication, propulsion, life in space—and how we may benefit from space exploration. (S–A)

WEISER, WILLIAM J. THE SPACE GUIDEBOOK. Coward-McCann, approx. 325 p., illus., revised 1963. $5.75. A question-and-answer approach explaining space, space exploration, and how science is being applied to the conquest of space. (S–A)

WILKS, WILLARD F. THE NEW WILDERNESS: WHAT WE KNOW ABOUT SPACE. McKay, 170 p., illus., 1963. $4.50. An introduction to space and space travel. Discusses the composition of space, rocket technology, physical laws governing spaceflight, the U.S. space program, and reasons for exploring space. (S–A)

2/3

Science in Space

Books in this section deal in detail with the science and technology of space flight. Topics discussed include space electronics, guidance and control, tracking facilities, astromechanics, space flight mathematics, navigation in space, solar cells, and solar energy, the roles of the various scientific disciplines in space exploration, and astronautics. Additional information on these subjects may be found in books listed in this bibliography under such sub headings as "Rocketry", "Extraterrestrial Life", "Bioastronautics" and "Astronomy". Less detailed discussions of these subjects may be found in numerous books listed on page 3 in this bibliography. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*AHRENDT, MYRL H. THE MATHEMATICS OF SPACE EXPLORATION. Holt, 160 p., illus., 1965. Paperback, $1.96. Some of the mathematics involved in space exploration and the laws of celestial mechanics. Space-related materials of instruction for mathematics teachers and students with problems for students to solve. One of 14 volumes of the SPACE SCIENCE SERIES. (S)

*BUTLER, S. T. and H. MESSEL, editors. A JOURNEY THROUGH SPACE AND THE ATOM. Macmillan, 495 p., illus., 1963. $3.75. A series of lectures by eminent scientists prepared for high school seniors in New Zealand. Lectures cover such subjects as the structure of the universe, life in the galaxy, rocketry, spacecraft, guidance and control. U.S. space projects serve as examples in explaining various principles and activities in space. (S–A)

*ENGLE, ELOISE and KENNETH H. DRUMMOND. SKY RANGERS. Day, 236 p., illus., 1965. $4.95. How we keep track of space hardware in the sky, including a history of satellite tracking and descriptions of the Minitrack network, optical tracking, the military tracking system, and the network covering manned space flight. (S–A)

*ENGLEBARDT, STANLEY L. ELECTRONICS. Pyramid, 175 p., illus., 1963. Paperback, 75 cents. A summary of our knowledge about the electron and how man has put this knowledge to work. Background information about many of the devices used in spacecraft and space research. (S–A)

*GLASSTONE, SAMUEL. SOURCEBOOK ON THE SPACE SCIENCES. VanNostrand, 900 p., illus., 1965. $7.95. Stresses significant advances in existing sciences that can be contributed by space flight. Covers present state of the space exploration program and its impacts on the future growth of knowledge for all scientific and engineering areas. Written in cooperation with the National Aeronautics and Space Administration. Semitechnical. (A)

*GOTTLIEB, WILLIAM P. SPACE FLIGHT AND HOW IT WORKS. Doubleday, 61 p., illus., 1963. $3.50. Simple explanations and experiments to demonstrate rocket propulsion, orbiting and gravitational pull, and the effects of space conditions on man in space. (I–U)

*HALACY, D. S., JR. THE COMING AGE OF SOLAR ENERGY. Harper, 288 p., illus., 1963. $4.95. The uses that have been and will be made of solar energy. Part of the book discusses the importance of solar power devices for propulsion and auxiliary power for space stations and for spacecraft on "deep space" missions of the future. (S)

*HIRSCH, S. CARL. THE GLOBE FOR THE SPACE AGE. Viking, 88 p., illus., 1963. $3.75. How the shape and motions of the globe relate to geography, time, the seasons, weather, and the space program. (U–S)

*HOBERMAN, STU. SOLAR CELL AND PHOTOCELL EXPERIMENTERS GUIDE. Sams, 128 p., illus., 1965. $2.95. The theory, application and construction of light-sensitive solar and photoelectric cells. Easy-to-build and low-cost projects are described, such as a sun-powered radio and a basic photoelectric (solar) relay. (S)

*HYMOFF, EDWARD. GUIDANCE AND CONTROL OF SPACECRAFT. Holt, 179 p., illus., 1965. Paperback, $1.96. Explanations of the systems used to guide and control spacecraft on various types of missions, both manned and unmanned. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

*LE GALLEY, DONALD P., editor. SPACE SCIENCE. Wiley, 668 p., illus., 1963. $17.50. Sixteen space scientists and engineers discuss major space exploration areas, the findings and evaluations from the first five years of the "Space Age." (Semitechnical) (A)

LEVITT, I. M. and DANDRIDGE M. COLE. EXPLORING THE SECRETS OF SPACE. Prentice, 306 p., illus., 1963. $5.95. Astronautics for the layman. A basic discussion of space-age astronomy and physics with explanations of the roles that biology, psychology, medicine and other physical sciences play in the planning of space flights. (S–A)

*MEITNER, JOHN G., editor. ASTRONAUTICS FOR SCIENCE TEACHERS. Wiley, approx. 344 p., 1965. $8.50. Ten authors discuss their special fields (physics, biology, mathematics, etc.) as they relate to astronautics, or the general area of space travel. A concluding chapter suggests methods and aids for introducing astronautics in the science classroom. College level. (A)

*ORDWAY, FREDERICK I., III and OTHERS. APPLIED ASTRONAUTICS. Prentice, 449 p., illus., 1963. $14.95. An introductory survey of the techniques, equipment and operations involved in space flight—spacecraft, launching vehicles, launching methods, flight mechanics, trajectories, orbital rendezvous, re-entry problems, communications, tracking and space navigation. (Semitechnical) (A)

*PARK, ROBERT A. and THOMAS MAGNESS. INTERPLANETARY NAVIGATION. Holt, Rinehart and Winston, 128 p., illus., 1964. Paperback, $2.50. Principles and methods for travelling to other planets. Discusses orbits, trajectories, navigation, launching, landings and possibilities for travelling to remote stars. Includes a hypothetical voyage to Mars and Venus. (U-S)

*SANGER, EUGEN. SPACE FLIGHT: COUNTDOWN FOR THE FUTURE. McGraw-Hill, 301 p., illus., 1965. $6.95. The technology and science of space flight are examined and explained in detail. Specific facts and formulas are given as bases for statements on the development of space travel and predictions for its future. (A)

*SEIFERT, HOWARD S. and MARY H. SEIFERT. ORBITAL SPACE FLIGHT. Holt, 128 p., illus., 1964. Paperback, $1.28. The physics of orbital flight and concepts involved in the routine of manned and unmanned satellite launchings. A book in the Holt Library of Science series. (S-A)

*SUTTON, RICHARD M. THE PHYSICS OF SPACE. Holt, 176 p., illus. 1965. Paperback, $1.96. Space science and its relationship to the study of physics. Explains the nature and structure of the universe and some of the latest discoveries in space in terms which the student and layman can understand. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

*THOMAS, SHIRLEY. SATELLITE TRACKING FACILITIES, THEIR HISTORY AND OPERATION. Holt, Rinehart and Winston, 128 p., illus., 1963. Paperback, $1.28; hard bound, $2.50. The history and important role of worldwide satellite tracking facilities that link us with our "tiny-voiced" travelers in space. (S-A)

*VAN DE KAMP, PETER. ELEMENTS OF ASTROMECHANICS. Freeman, 140 p., illus., 1964. Paperback, $2; hard bound $4. A concise introduction to astromechanics emphasizing the motions of planets and artificial satellites. Discusses sizes and shapes of orbits and suborbital flight, time and velocity to reach the moon, gravity, weightlessness and other semitechnical topics. (A)

*WELLS, ROBERT. ELECTRONICS: KEY TO EXPLORING SPACE. Dodd, 175 p., illus., 1964. $3.25. Explanations of the tools used in gathering information about space, which have developed from man's understanding of electromagnetic energy. Discusses radio, radar, TV cameras, telemetering, sensors, computers and their binary language. (S)

Rocketry

Books in this section furnish information about rocket technology—the principles of rocket propulsion, rocket propellants, uses of rockets, history of rocketry, launching procedures, trajectories, and model rocketry. Less detailed discussions of these subjects may be found in books listed on page 3 of this bibliography. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*BUTTERWORTH, W. E. THE WONDERS OF ROCKETS AND MISSILES. Putnam, 120 p., illus., 1964. $2.50. The history of rockets and missiles as valuable tools of science and exploration and as weapons. (U-S)

COOMBS, CHARLES. LIFT-OFF: THE STORY OF ROCKET POWER. Morrow, 96 p., illus., 1963. $2.95. The story of rocket power. Examples of the laws of acceleration and thrust, how rockets are built, descriptions of liquid and solid fuel rockets, and guidance systems. (U)

*[illegible], HAROLD W. PETER, THE ROCKET SITTER. Benefic, 64 p., illus., 1964. $2.20. Peter, the son of a space scientist, offers to help an amateur rocketeer and thereby becomes a witness to the launching of both his friend's rocket and his rocketry career. (P)

*————. PETER AND THE ROCKET TEAM. Benefic, 64 p., illus., 1964. $2.20. Peter learns about teamwork as his mechanic friend joins a rocket launch crew. (P)

*EMME, EUGENE M., editor. THE HISTORY OF ROCKET TECHNOLOGY. Wayne, 320 p., illus., 1964. $9.50. A comprehensive survey of the origin and development of modern rocketry, written by foremost rocket authorities and edited by the official historian of NASA. An aid to understanding the pace, complexity and significance of rocket technology. (S-A)

*GOODWIN, HAROLD L. ALL ABOUT ROCKETS AND SPACE FLIGHT. Random, 145 p., illus., 1964. $1.95. Explains how rockets developed, how they work and how they are being used for research and exploration in space. (I-U-S)

*GURNEY, GENE, editor. ROCKET AND MISSILE TECHNOLOGY. Watts, 224 p., illus., 1964. $3.95. A collection of previously published articles and excerpts that explain rocket and missile technology—its history, development, and application in our space programs. (A)

*HOBBS, MARVIN. FUNDAMENTALS OF ROCKETS, MISSILES AND SPACECRAFT. Rider, 275 p., illus., revised 1964. Paperback, $2.95. Discusses the theory and application of basic elements of rockets, missiles and propulsion systems for space vehicles as well as both manned and unmanned spacecraft. Considers aerodynamic shapes, nose cones, guidance and telemetry in addition to launching methods. Nontechnical language is used to give background details to the nonspecialist. (S-A)

*HUNTER, MAXWELL W., II. THRUST INTO SPACE. Holt, 192 p., illus., 1966. Paperback, $1.96. The basic concepts and laws of rocketry, including requirements for interplanetary and interstellar travel. Investigates problems, and the mechanics and dynamics of various types of space flight. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

JAMES, GEORGE S., editor. ROCKET SAFETY FOR STUDENTS. Rocket Research Institute, 100 p., illus., 1963. $2.50. Basic rocket training devices for supervised high school rocket science programs. Discusses commercially available training devices and includes a bibliography of material on rocket safety education and space-age references. (S)

*[illegible], CHAS. UNDERSTANDING ROCKETS AND THEIR PROPULSION. Rider, 122 p., illus., 1964. Paperback, $2.95. A nontechnical discussion of how rocket engines work and their uses and propellants. Includes solid and liquid fueled rockets and experimental electric and nuclear rockets. Considers rocket guidance, trajectories, and recovery techniques. Also describes Projects Gemini and Apollo. (S-A)

*[illegible], JAMES V. DISCOVERING AEROSPACE. Children's, 100 p., illus., 1965. $2.50. The story of flight from balloons to spaceships. Includes simple experiments to show principles of flight and to encourage children to observe, question, discover and understand the concepts related to aerospace. (I-U)

*[illegible], ROY A. ROCKETS TO EXPLORE THE UNKNOWN. Whitman, 60 p., illus., 1962. 39 cents. Available in library binding from Golden Press, $2.24. Principles of rocket propulsion, rocket launchings, rocket fuels and rockets of the future. (I)

*STINE, G. HARRY. A HANDBOOK OF MODEL ROCKETRY. Follett, 204 p., illus., 1965. $5.95. A comprehensive book about how to safely build and launch model rockets, including calculations for designing, tracking, etc. Also, accurate descriptions of materials and methods, and information on organizing a model rocketry club that can be affiliated with the National Association of Rocketry. (U-S)

*VICTOR, EDWARD. PLANES AND ROCKETS. Follett, 32 p., illus., 1965. $1. A simple and graphic explanation of an airplane and the basic principles of flight. Also includes simple explanations of rocket engines and fuels. (P-I)

Astronomy

Books in this section survey the sun, the moon, and members of the solar system, stars, galaxies and other natural objects in space. Other topics discussed are the history of astronomy, the mysteries of space beyond our solar system, radioastronomy and astronomical instruments. Each book relates the science of astronomy to man's efforts to explore space. Further information on these subjects may be found in books listed in this bibliography under such sub headings as "Science in Space" and "Extraterrestrial Life". Less detailed material may also be found in books listed on page 3. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*ALTER, DINSMORE. PICTORIAL GUIDE TO THE MOON. Crowell, 183 p., illus., 1963. $6.95. A guide to lunar geography by one of America's foremost astronomers. Photographs taken at Mt. Wilson and Lick Observatories illustrate this guide which also includes a unique system of coordinates to enable the reader to locate easily specific points mentioned in the text. (S–A)

*BINDER, OTTO O. RIDDLES OF ASTRONOMY. Basic, 210 p., illus., 1964. $4.95. Using a question and answer format, the author discusses more than 100 tantalizing mysteries of space in the light of knowledge acquired from our current space research. (U–S)

*BRANLEY, FRANKLYN M. WHAT THE MOON IS LIKE. Crowell, 40 p., illus., 1963. $2.95. A Let's-Read-and Find-Out Science book that answers many questions children ask about the moon's atmosphere and geography. (P)

*BRENNA, VIRGILIO. THE MOON. Golden, 108 p., illus., 1963. $5.32. A survey of what science knows about the moon and what lunar explorers may find. Color photographs of scale models of the moon's surface are among the book's many illustrations. (U–S)

*CHISNALL, G. A. and GILBERT FIELDER. ASTRONOMY AND SPACE RESEARCH. Norton, 230 p., illus., first American edition, 1964. $5.95. An introduction to the principles of astronomy and space research. Emphasizes gravitation, radiation and modern rocketry. Discusses future possibilities for astronomy conducted from artificial satellites. Some knowledge of mathematics will be helpful in using this book. The first American edition of a 1962 book. (A)

*COLE, DANDRIDGE M. and DONALD W. COX. ISLANDS IN SPACE: THE CHALLENGE OF THE PLANETOIDS. Chilton, 276 p., illus., 1964. $6.95. The importance of planetoids in the exploration of space. Includes a summary of what we know about planetoids today and how they might provide living space for future populations. (S–A)

FENTON, CARROLL LANE. THE MOON FOR YOUNG EXPLORERS. Day, 64 p., illus., 1963. $3. A "make-believe" trip to the moon for young adventurers. The moon's motions and lunar conditions are described in simple terms, and the reader may discover for himself some of the problems of lunar exploration—heat, cold, radiation, lack of air, etc. (P–I)

*GUILLOT, RENE. ASTRONOMY. Whitman, 112 p., illus., 1963. $2. Available from Golden Press in library binding, $5.32. A survey of the universe with chapters on the sun, the moon, the planets, the mysteries of outer space, and space travel. (I–U)

*HOYLE, FRED. OF MEN AND GALAXIES. University of Washington, 73 p., 1964. $2.95. A philosophical discussion of the relationship of science and society, man's future on this planet, and the possibilities and implications of interplanetary communication. An astronomer's view of life. (S–A)

HYDE, FRANK W. RADIO ASTRONOMY FOR AMATEURS. Norton, 236 p., illus., first American edition, 1963. $5. An explanation of the fundamentals of radio astronomy and its history. Also provides information for those with a working knowledge of electronics who are interested in building their own radio astronomy equipment. (A)

*JACKSON, JOSEPH H. PICTORIAL GUIDE TO THE PLANETS. Crowell, 216 p., illus., 1965. $7.95. Descriptions of the planets, earth, moon, asteroids, meteors, comets and artificial satellites. Outlines principles of rocketry and space vehicles operation, and discusses the problems of manned space flight and extraterrestrial life. (S–A)

*KIEFER, MILDRED S. PLANET X. Melmont, 64 p., illus., new edition, 1965. $1.50. A boy's interest in astronomy leads him to discover how astronomers work and shows him the value of accurate scientific knowledge in the conquest of space. (P–I)

*KING, H. C. EXPLORATION OF THE UNIVERSE. Signet, 335 p., illus., 1964. Paperback, 75 cents. A history of astronomy from earliest times to the discoveries of today's radio telescopes. (S–A)

*LEAR, JOHN. KEPLER'S DREAM. University of California Press, 182 p., 1965. $5. The first complete English translation of Kepler's masterpiece describing a voyage to the moon, with the author's interpretation of Kepler's manuscript. (A)

*LEY, WILLY. BEYOND THE SOLAR SYSTEM. Viking, 108 p., illus., 1964. $6.50. Basing his ideas on present and near future space flight technology, the author describes the first manned flight to the neighboring stellar system, Alpha Centauri. Includes a survey of the solar system, various means of interstellar travel, and present knowledge of the Milky Way galaxy. (S–A)

*LOVELL, BERNARD and JOYCE LOVELL. DISCOVERING THE UNIVERSE. Harper, 136 p., illus., 1963. $3.95. An explanation of the great radio telescope at Jodrell Bank—how and why it was built, how it operates and its astonishing discoveries. (S–A)

*MESSEL, H. and S. T. BUTLER, editors. SPACE PHYSICS AND RADIOASTRONOMY. St. Martin's, 174 p., illus., 1964. $4.25. A series of lectures by physicists updating science teachers on new techniques for investigating distant stars and galaxies, the physics of space flight and artificial satellites. (A)

*MOORE, PATRICK. A SURVEY OF THE MOON. Norton, 333 p., illus., rev. 1963. $6.95. A guide to the moon, its geography, geology, and movements. Also, a discussion of man's gradually perfected observations of the moon and his coming on-the-spot explorations. (S–A)

*————. THE PICTURE HISTORY OF ASTRONOMY. Grosset, 255 p., illus., rev., 1964. $6.25, library ed. A nontechnical story of the science of astronomy with many illustrations, and including new findings resulting from research in space. (U–S)

*MOTZ, LLOYD. THIS IS ASTRONOMY. Columbia, 279 p., illus., 1963. Paperback. $1.75. An introduction to astronomy presenting recent discoveries and theories of this rapidly changing science. Considers the members of our solar system, the stars, galaxies and extra-galactic space. How astronomers determine facts about heavenly bodies and how artificial satellites, space probes and the development of radio astronomy have enlarged our knowledge of space. (S–A)

*PAGE, THORNTON and LOU WILLIAMS PAGE, editors. WANDERERS IN THE SKY. Macmillan, 338 p., illus., 1965. $7.95. A collection of approximately 100 articles from a leading astronomy magazine relating to developments in astronomy that have made space exploration and technology possible. Articles cover such subjects as space probes, the hazards of matter in space, and the moon. (S–A)

*PAGE, LOU WILLIAMS. A DIPPER FULL OF STARS. Follett, 224 p., illus., rev., 1964. $3.50. A beginner's guide to the heavens with star maps. The concluding chapter considers manned and unmanned spacecraft, space probes, trajectories and orbits, and how space exploration is contributing to our knowledge of the universe. (U–S–A)

*PIPER, ROGER. THE BIG DISH. Harcourt, 159 p., illus., 1963. $3.25. The giant radio telescope at Jodrell Bank in England is the focus of this account of radio telescopes—their uses and accomplishments in the space age. (U–S)

*RAPPORT, SAMUEL and HELEN WRIGHT, editors. ASTRONOMY. New York University, 354 p., illus., 1964. $4.95. An introduction to astronomy presented as excerpts from the writings of founders of modern astronomy. Includes articles on the Mariner II spacecraft mission to Venus, speculation on life in other worlds, and radio telescopes. (S–A)

*REICHEN, CHARLES-ALBERT. A HISTORY OF ASTRONOMY. Hawthorn, 111 p., illus., 1963. $5.95. The story of astronomy from the first stargazer to modern concepts and instruments, including the radio telescope. (S–A)

*RICHARDSON, ROBERT S. and CHESLEY BONSTELL. MARS. Harcourt, 151 p., illus., 1964. $8.50. A summary of our knowledge about Mars, an explanation of three possible propulsion systems that may be used to reach this planet, and methods for exploring and colonizing it. (S–A)

*SADIL, JOSEF. THE MOON AND THE PLANETS. Hamlyn, 184 p., illus., 1963. $9.95. Descriptions of the moon and the planets in non-technical terms. Many of the very unusual, large, and outstanding black and white and color illustrations are artists' impressions based upon "historical investigation and modern technological research". (U–S–A)

*SKILLING, W. T. and R. S. RICHARDSON. SUN, MOON AND STARS. McGraw, 304 p., illus., rev., 1964. $5.95. An up-dated, extensively revised edition of a popular book that now includes an emphasis on space age exploration through satellites and space probes and the newest developments in devices and techniques of observation. (S–A)

*SMITH, ALEX G. and THOMAS D. CARR. RADIO EXPLORATION OF THE PLANETARY SYSTEM. Van Nostrand, 144 p., illus., 1964. Paperback, $1.50. How radio astronomy has added to our knowledge of the moon and planets and affected our space program. Discusses the history of radio astronomy and techniques. (A)

*STERN, PHILLIP D. OUR SPACE ENVIRONMENT. Holt, 160 p., illus., 1965. Paperback, $1.96. A practical guide to the planets, comets, and stars and a discussion of the latest facts and theories about the universe resulting from the exploration of space. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

*WHIPPLE, FRED L. EARTH, MOON, AND PLANETS. Harvard, 278 p., illus., revised, 1963. $6.50. Current information about the members of our solar system including information obtained from radio telescopes, radar, high-altitude balloons, rocket flights, the Mercury spacecraft, and the Mariner II space probe of Venus. (S–A)

*WYLER, ROSE and GERALD AMES. THE NEW GOLDEN BOOK OF ASTRONOMY. Golden, 108 p., illus., rev. 1965. $5.32. An introduction to space with accounts of developments and achievements in space exploration. (U)

Unmanned Spacecraft and Space Probes

Books in this section explain the purposes, operation, and accomplishments of unmanned satellites and space probes such as orbiting observatories, the Echo, Relay, and Syncom communications satellites, the Tiros weather satellites, the Ranger and Surveyor lunar probes and the Mariner flights to Venus and Mars. Less detailed information on these subjects may be found in books listed under the section in this bibliography entitled "Science in Space", and also in books listed on page 3. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*ASIMOV, ISAAC. SATELLITES IN OUTER SPACE. Random, 77 p., illus., revised 1964. $1.95. An updated version of the author's first book, now including accounts of Telstar, the Venus probe and Russian and American manned space flights. (I)

*CHESTER, MICHAEL. ROBOTS IN SPACE. Putnam, 128 p., illus., 1965. $3.50. Two types of space robots—satellites and probes—are discussed in relation to their use in gathering necessary information about the moon and planets before man can explore them himself. Explains Ranger, Mariner, Surveyor, Tiros, and other spacecraft. (U–S)

*CORLISS, WILLIAM. SPACE PROBES AND PLANETARY EXPLORATION. Van Nostrand, 542 p., illus., 1965. $7.75. A comprehensive report on the objectives of unmanned spacecraft and the equipment necessary to fulfill their missions. Emphasis is on instrumentation rather than results and their interpretation. Written under the sponsorship of the National Aeronautics and Space Administration. Semitechnical. (A)

*HENDRICKSON, WALTER B., JR. SATELLITES AND WHAT THEY DO. Bobbs-Merrill, 272 p., illus., 1963. $3.95. Discusses the planning and design of satellites, what we have learned about space through their use, how man has used satellites to travel into space, and future use of satellites. (S)

*JAFFE, LEONARD. COMMUNICATIONS IN SPACE. Holt, 167 p., illus., 1965. Paperback, $1.96. The development of satellites to transmit radio and television signals from one point on earth to another. Explains theories involved and the workings of Echo, Relay, Telstar, and Syncom satellites. Also considers the future of this mode of communications. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

*LEINWOLL, STANLEY. SPACE COMMUNICATIONS. Rider, 166 p., illus., 1964. Paperback, $3.95. A full discussion of the use of earth satellites for communications. Provides radio amateurs and shortwave listeners with information on the hobby of space listening. (S–A)

*LEY, WILLY. OUR WORK IN SPACE. Macmillan, 143 p., illus., 1964. $3.95. How satellites are placed in orbit, their purposes, and benefits. (U–S)

*————. RANGER TO THE MOON. Signet, 127 p., illus., 1965. Paperback, 60 cents. The story of the lunar space probe, Ranger VII and the significance of the closeup pictures of the moon's surface sent back to earth. (S–A)

MARINER: MISSION TO VENUS. McGraw, 118 p., illus., 1963. $3.50. Paperback, $1.45. A report on the Mariner II spacecraft's epic voyage past Venus in 1962. Prepared by the staff of the Jet Propulsion Laboratory that designed, planned, and coordinated the mission. Discusses problems involved, accomplishments and interpretation of the spacecraft's findings. (S–A)

*MUELLER, ROBERT E. EYES IN SPACE. Day, 159 p., illus., 1965. $3.75. Satellites, telescopes, balloons, and space observatories are only a few ways man has extended his vision into space. How and what man in the future will be seeing in the far reaches of the universe. (U–S)

*NAUGLE, JOHN E. UNMANNED SPACE FLIGHT. Holt, 160 p., illus., 1965. Paperback, $1.96. The many scientific experiments carried on by instrumented unmanned satellites and space probes. Describes science as practiced in space, the important results and new knowledge gained. One of 14 volumes in SPACE SCIENCE SERIES. (S)

*NEWLAN, IRL. FIRST TO VENUS. McGraw, 64 p., illus., 1963. $2.95. The story of the Mariner II spacecraft's flight to Venus and the information it sent back to earth. (S)

*STAMBLER, IRWIN and GORDON ASHMEAD. PROJECT MARINER. Putnam, 128 p., illus., 1964. $3.29. A step-by-step account of the building, launching and tracking of the Mariner II spacecraft on its voyage to Venus. (U–S)

*VAETH, J. GORDON. WEATHER EYES IN THE SKY. Ronald, 124 p., illus., 1965. $5. The development and operation of weather satellites. New techniques of weather observation resulting from the space program and what we may expect from weather forecasting in the future using these new techniques. (S–A)

*WIDGER, WILLIAM K., JR. METEOROLOGICAL SATELLITES. Holt, 272 p., illus., 1965. Paperback, $1.96. The application of spacecraft to meteorological observations and weather forecasting, and a study of the development and operation of the Tiros and Nimbus weather satellites. Also discusses more sophisticated weather satellites of the future. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

Manned Space Flight

Books in this section explain the problems and goals of manned space flight. Astronaut selection and training, the accomplishments of the Project Mercury flights, and the preparation and hopes for Projects Gemini and Apollo are discussed in detail. Additional general information on these subjects may be found in books listed in this bibliography on page 3. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*ALEXANDER, THOMAS W. PROJECT APOLLO: MAN TO THE MOON. Harper, 234, p., illus., 1964. $4.50. The story of the most gigantic technical program ever undertaken: the anticipated visit of U.S. astronauts to the moon. (S–A)

*BRANLEY, FRANKLYN M. A BOOK OF ASTRONAUTS FOR YOU. Crowell, 64 p., illus., 1963. $3.75. The young reader can learn many facts about our astronauts—how they are selected, what training they undergo, the dangers they face and the spacecraft they ride in (P–I)

*———. EXPLORATION OF THE MOON. Doubleday, 127 p., illus., 1963. $3.50. What we have learned about the moon to help us explore it. Problems yet to be solved regarding lunar exploration, colonization, and permanent use of the moon as a space platform. (U–S)

*CAIDIN, MARTIN. BY APOLLO TO THE MOON. Dutton, 192 p., illus., 1963. $3.50. The story of Project Apollo featuring a hypothetical journey to the moon based on present plans for a manned flight to the moon. (U)

*———. THE MOON; NEW WORLD FOR MEN. Bobbs-Merrill, 406 p., illus., 1963. $5.95. An analysis of our lunar program—its goals, methods, strengths and weaknesses. Descriptions of lunar conditions and how man may be expected to survive on the moon. (S–A)

CHESTER, MICHAEL. LET'S GO ON A SPACE TRIP. Putnam, 48 p., illus., 1963. $1.95. The author takes young readers on a rocket which will orbit the earth. A composite account of the spaceships already in use as well as a look into the future. (P–I)

*———. LET'S GO TO THE MOON. Putnam, 47 p., illus., 1965. $1.97, library edition. The reader takes an imaginary trip to the moon during which he learns about the experiences and duties our astronauts will have when they make their first voyage under Project Apollo. (I)

CHESTER, MICHAEL and DAVID MC'CLINTON. THE MOON: TARGET FOR APOLLO. Putnam, 192 p., illus., 1963. $3.50. A history of the moon, how man has gained knowledge of the moon, and a description of Project Apollo—our space program for manned exploration of the moon. (U)

*COOMBS, CHARLES. PROJECT APOLLO. MISSION TO THE MOON. Morrow, 96 p., illus., 1965. $2.95. A simple explanation of the proposed three-man journey to the moon—from launching to return to earth—written in graphic style as though the flight were actually under way. (I–U)

*ELTING, MARY. SPACECRAFT AT WORK. Harvey, 96 p., illus., 1965. $2.95. Unusual stories about experiences of astronauts and what they can expect when they go to the moon and beyond. (I)

*FAGET, MAX. MANNED SPACE FLIGHT. Holt, 168 p., illus., 1965. Paperback, $1.96. The development of manned spacecraft and the problems and their solutions in training astronauts. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

*GEMINI: AMERICA'S HISTORIC WALK IN SPACE. Prentice, 104 p., illus., 1965. $2.95. United Press International newsmen draw on UPI news and photographic files to record the Gemini 4 flight from launch to recovery. Astronaut White's walk in space is especially featured. (U–S–A)

*HILL, ROBERT W. WHAT THE MOON ASTRONAUTS WILL DO ALL DAY. Day, 64 p., illus., 1963. $2.68. An illustrated explanation of the many facets of Project Apollo. (U–S)

*HINES, WILLIAM. CONQUEST OF THE MOON. Pyramid, 160 p., illus., 1964. Paperback, 75 cents. An account of America's preparations for sending a manned mission to the moon, based on facts gathered from NASA and the aerospace industry. (S–A)

*LEVINE, SOL. APPOINTMENT IN THE SKY. Walker, 214 p., illus., 1963. $5. A senior engineer involved in Project Gemini describes this important intermediary step toward manned exploration of the moon. Includes brief biographies of all NASA astronauts, reports on women who have experienced some of the grueling physical tests given to astronaut candidates, and a glossary. (S–A)

MYRUS, DON. THE ASTRONAUTS. Grosset, 93 p., illus., rev., 1963. $1.95. How America's first astronauts were selected and trained. Includes highlights from orbital flights. (I–U)

*SCHARFF, ROBERT. INTO SPACE WITH THE ASTRONAUTS. Grosset, 48 p., illus., 1965. $2.39, library edition, also available from Merrill, $1.60. How an astronaut is trained to fly in space. Discusses the hazards of space flight and how they will be overcome. Explains space terms and describes the accomplishments of manned spaceflights, and plans for reaching the moon. (U)

*SHANKLE, RALPH O. THE TWINS OF SPACE. Lippincott, 223 p., illus., 1964. $4.95. A report on Project Gemini—the Gemini astronauts and their training, the Gemini spacecraft, and the hoped-for accomplishments of Gemini missions. (S–A)

*SHELTON, WILLIAM ROY. FLIGHTS OF THE ASTRONAUTS. Little, Brown, 205 p., illus., 1963. $3.75. Narrative accounts of the first five Project Mercury flights—those of Astronauts Shepard, Grissom, Glenn, Carpenter and Shirra. (U–S)

*SOULE, GARDNER. GEMINI AND APOLLO. Meredith, 64 p., illus., 1964. $1.95. A thorough look at Project Gemini—our next step toward the moon—and the culminating mission of manned lunar exploration under Project Apollo. Also discusses the details of living conditions on the moon. (U–S)

STAMBLER, IRWIN. ORBITING STATIONS. Putnam, 95 p., illus., 1965. $3.29. Explains the research and experimental vehicles leading to tomorrow's space stations. Discusses how they will be built and manned and their future contributions to the exploration of space. (U–S)

*__________. PROJECT GEMINI. Putnam, 64 p., illus., 1964. $2.95. An explanation of Project Gemini, the successor to Project Mercury and our next step toward the moon. How the project differs from other United States and Russian space programs, what it hopes to accomplish and how it will add to our ability to reach the moon. (U–S–A)

*STOIKO, MICHAEL. PROJECT GEMINI. Step to the moon. Holt, 128 p., illus., 1963. $3.95. A brief account of man in space with emphasis on Project Gemini and its relation to manned exploration of the moon. Includes a summary of the history of space travel and rocketry. (U–S)

*SUTTON, FELIX. THE HOW AND WHY WONDER BOOK OF THE MOON. Grosset, 48 p., illus., 1963. $2.08 library ed. Available also from Noble, $2.78. Prepares the reader to understand the coming exploration of the moon under Project Apollo. (I–U)

Bioastronautics—The Effects of Space Flight and Space Conditions on Living Organisms and the Human Body and Mind

Books in this section consider the physical and mental hazards man faces in space. They discuss weightlessness, radiation, vibration, acceleration, temperature extremes, oxygen, food, and water supply, and solutions to the numerous problems of maintaining life beyond the earth's atmosphere. Additional general information on these subjects may be found in books in this bibliography listed on page 3. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*BERGWIN, CLYDE R. and WILLIAM T. COLEMAN. ANIMAL ASTRONAUTS. Prentice, 207 p., illus., 1963. Out of print. The story of the contributions made by animals to space research. The "why's" and "how's" of the use of animals in man's quest for knowledge of space environment and its effects on life. (S–A).

*BROWN, J. H. E., editor. PHYSIOLOGY OF MAN IN SPACE. Academic, 348 p., illus., 1963. $13. A collection of articles on major physical problems of man in space written by scientists working in the field. Discusses acceleration, stress, psychological effects, human tolerances, weightlessness and many other physical areas. Semitechnical. (A)

*BURNS, NEAL M. and OTHERS, editors. UNUSUAL ENVIRONMENTS AND HUMAN BEHAVIOR. Free Press, 438 p., illus., 1963. $9.95. Biological problems of man in space. An overview of research and ideas associated with each of the environmental stresses of space flight—weightlessness, high altitude, vibration, radiation, etc. Discusses advances that can be expected and new problems that may arise. Semitechnical. (A)

*CAIDIN, MARTIN. THE GREATEST CHALLENGE. Dutton, 320 p., illus., 1965. $5.95. The physical and mental hazards of manned exploration of space beyond the moon are evaluated. (S–A)

*GERATHEWOHL, SIEGFRIED. PRINCIPLES OF BIOASTRONAUTICS. Prentice, 557 p., illus., 1963. $14.95. A semitechnical discussion of the relationship of the life sciences to the exploration of space. Covers detection of life in the universe, the effects of space environment on living organisms, life support in space, and biological implications of manned exploration of the planets. (A)

*HARDY, JAMES D., editor. PHYSIOLOGICAL PROBLEMS IN SPACE EXPLORATION. Thomas, 333 p., illus., 1964. $12.50. Seven space medicine scientists discuss physiological and psychological stresses to the human body brought about by space flight. Presents background information and the present state of knowledge in several aspects of space psychophysiology for the student and interested general reader. Semitechnical. (A)

*HENRY, JAMES P. BIOMEDICAL ASPECTS OF SPACE FLIGHT. Holt, 174 p., illus., 1965. Paperback, $1.96. The many physiological problems facing men as they go into space and how these are being solved. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

Extraterrestrial Life

Books in this section explore the possibilities of life beyond the earth. Discussions center on the known physical and chemical facts about planets that could sustain life as we know it. Some of the books listed below speculate on the possibilities of intelligent life in other parts of the universe, communications with possible intelligent extrasolar life, and contamination resulting from man's physical contact with other members of the solar system and with other worlds. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*ANDERSON, POUL. IS THERE LIFE ON OTHER WORLDS? Crowell-Collier, 223 p., illus., 1963. $4.95. What explorers of neighboring planets may expect to find, based on present knowledge. A tentative but reasonable estimate of the possible and probable, drawn from the known physical and chemical facts about our solar system. (S–A)

*DOLE, STEPHEN H. and ISAAC ASIMOV. PLANETS FOR MAN. Random, 242 p., illus., 1964. $4.95. Speculations on life and life sustaining conditions on other worlds, based on present biological and cosmological knowledge. (S–A)

*FIRSOFF, V. A. LIFE BEYOND THE EARTH. Basic, 320 p., illus., 1963. $7.50. Drawing on a knowledge of planetary systems and on available chemical information, the author sifts possible evidence of life as it is brought to earth by meteorites, and scrutinizes alternative organic chemistries which might exist in environments where ours could not. (A)

*GARDNER, MARJORIE H. CHEMISTRY IN THE SPACE AGE. Holt, 168 p., illus., 1965. Paperback, $1.96. The chemistry of the solar system and beyond, with an introduction to the possibilities of life on other planets. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

*HEUER, KENNETH. MEN OF OTHER PLANETS. Collier, 160 p., illus, 1963. Paperback, 95 cents. An updated revision of a book first published in 1951, which recognizes the advances made in the exploration of space both by man and by instruments. Scientific theory and calculated speculation based on today's knowledge are used by the author to describe the possibilities of life in other parts of our universe. (S–A)

*MACVEY, JOHN W. ALONE IN THE UNIVERSE? Macmillan, 274 p., 1963. $5.95. The mathematical probabilities for the existence of planets similar to Earth and the environmental and chemical prerequisites for the support of life on such planets. Includes hypothetical trips to seven planets, each having a form of life adapted to its specific conditions. (A)

*MOFFAT, SAMUEL and ELIE A. SHNEOUR. LIFE BEYOND THE EARTH. Scholastic, 160 p., illus., 1965. Paperback, 50 cents. How the biological sciences are contributing to our knowledge of space. Life on other planets and the problem of contaminating our neighbors in space with earth-derived organisms are discussed. This book is one in the Vistas of Science series developed as a joint project of the National Science Teachers Association and the National Aeronautics and Space Administration. Epilogue by Joshua Lederberg. (U–S)

*ORDWAY, FREDERICK I., III. LIFE IN OTHER SOLAR SYSTEMS. Dutton, 96 p., illus., 1965. $3.75. Scientific facts on which astronomers base their reasons regarding the possibilities of life beyound our solar system. Discusses possible ways and means of detecting extrasolar life and communicating with it. (S–A)

*SHAPLEY, HARLOW. THE VIEW FROM A DISTANT STAR. Basic 224 p., 1963. $4.95. A philosophical discussion exploring the evolution of galaxies, the possibility of life on other planets, establishing communications with life on other planets, and man's place in a changing universe. (S–A)

*SULLIVAN, WALTER. WE ARE NOT ALONE. McGraw-Hill, 325 p., illus., 1964. $6.95. The science editor of the *New York Times* examines conditions in the universe and the findings of astronomers that support the theory that life exists beyond the earth. Discusses the history of man's attempts to communicate with other worlds and explores many questions that will rise if we find we are not alone in the universe. (S–A)

*TSUNG, THOMAS. IS THERE LIFE BEYOND THE EARTH? Exposition, 71 p., 1963. $3. Discusses current theories on the origin of the universe, the planetary system, and the possibility of life existing beyond the earth. Also discusses theories of the origin of life and the possibilities of life sustaining conditions on the planets. (S–A)

*YOUNG, RICHARD S. EXTRATERRESTRIAL BIOLOGY. Holt, 121 p., illus., 1965. Paperback, $1.96. A discussion of the possibilities of life on other planets with respect to ancient and recent theories of the origin of life. Descriptions of experimental investigations being carried on in laboratories and in space. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

Impacts of the Exploration of Space

Books in this section appraise the social, economic and political impacts of the space program. They discuss how space exploration is benefiting man, and how it has influenced new developments in medicine, industry, career opportunities, education, international politics, and many other areas of life. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*CAIDIN, MARTIN. WHY SPACE? AND HOW IT SERVES YOU IN YOUR DAILY LIFE. Messner, 208 p., illus., 1965. $4.95. The breakthroughs of space technology and how they are benefiting our lives today. Numerous specific instances are cited where the growth of knowledge engendered by our space program and its application are bettering our lives today. (S–A)

*DIAMOND, EDWIN. THE RISE AND FALL OF THE SPACE AGE. Doubleday, 158 p., 1964. $3.95. A critical examination of the U.S. space program with some suggestions for improvement. (A)

*FRUTKIN, ARNOLD W. INTERNATIONAL COOPERATION IN SPACE. Prentice, 192 p., 1965. $4.95. Explores man's future in space, the role of the National Aeronautics and Space Administration, and the importance of international cooperation if man is to achieve his ultimate destiny in space. (A)

*GIBNEY, FRANK and GEORGE J. FELDMAN. THE RELUCTANT SPACE-FARERS. New American Library, 200 p., 1965. $4.50. Discusses the political and economic consequences of America's space effort. An appraisal of the space program as it relates to our changing economy. (U–S)

GOLDSEN, JOSEPH M., editor. OUTER SPACE IN WORLD POLITICS. Praeger, 188 p., 1963. $5. Specialists in international relations assess the impact of space activities on world politics and the balance of power. (A)

*GOODWIN, HAROLD L. THE IMAGES OF SPACE. Holt, 189 p., 1965. Paperback, $1.96. The effects of space exploration successes and failures on the struggle between the democratic and communistic ideologies. Interesting historical space events; their political, economic, social and moral implications, and their contribution to national images. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

*HALEY, ANDREW G. SPACE LAW AND GOVERNMENT. Appleton-Century-Crofts, 601 p., 1963. $15. Man's activities in space and the legal consequences resulting from these activities. A comprehensive study of legal developments for the orderly governing of the realms of space. (A)

*LEVY, LILLIAN, editor. SPACE: ITS IMPACT ON MAN AND SOCIETY. Norton, 228 p., 1965. $4.50. Outstanding authorities such as James Webb, John Glenn, Wm. Foster, and Bishop Pike discuss the effects of space exploration on mankind relating to disarmanent, atomic power, education, religion, career opportunities, medicine, industry, etc. (A)

*LEY, WILLY. HARNESSING SPACE. Macmillan, 314 p., illus., 1963. $6.50. A heavily documented report to show that America's space program has practical and peaceful purposes as its primary consideration. Uses of satellites and space probes are analyzed from the point of view of their ultimate benefits to mankind. (S–A)

*MCDOUGAL, MYRES S., HAROLD D. LASSWELL, and IVAN A. VLASIC. LAW AND PUBLIC ORDER IN SPACE. Yale University Press, 1173 p., 1963. $15. The authors discuss legal problems resulting from the exploration of space, and suggest a framework of decision in which man can create a system of minimum or optimum public order in space. (A)

*OSSENBECK, FREDERICK J. and PATRICIA C. KROECK, editors. OPEN SPACE AND PEACE. The Hoover Institution, 227 p., 1964. $6. A symposium on the effect of observation of the earth from space, by sociopolitical experts. Presentations and subsequent discussions on impacts, problems of maintaining peace in space, history of observation from the air, technology and capabilities, feasible alternatives to unilateral observation and philosophy for freedom in space. (A)

*RUZIC, NEIL. THE CASE FOR GOING TO THE MOON. Putnam, 240 p., illus., 1965. $4.95. A report on the scientific and long-term commercial benefits expected from manned exploration of the moon, based on a poll of thousands of space scientists and engineers. (S–A)

*SCHWARTZ, MORTIMER D., editor. PROCEEDINGS OF THE CONFERENCE ON SPACE SCIENCE AND SPACE LAW. June 18–20, 1963. Rothman, 176 p., illus., 1964. $6.75. A compilation of papers presented by leading lawyers, scientists, and specialists representing government, education, and the business community at the University of Oklahoma. Subjects discussed include the peaceful uses of space, international cooperation in space, space law, military uses of space, and the social and economic implications of space flight. (A)

*STEKLER, HERMAN O. THE STRUCTURE AND PERFORMANCE OF THE AEROSPACE INDUSTRY. University of California Press, 223 p., 1965. $6.50. An analysis of the relationships existing between the federal government and private aerospace contractors. Covers the historical development of the aerospace industry, its major characteristics, the roles played by its various components, and an evaluation of its performance. (A)

*TAUBENFELD, HOWARD J., editor. SPACE AND SOCIETY. Oceana, 172 p., 1964. $5.95. A collection of papers from a 1963 seminar on problems of outer space sponsored by the Carnegie Endowment for International Peace. Included are discussions on such topics as the values and goals of space exploration, commercial space communications, political and legal aspects of space exploration, space law and the position of the scientist in space. (A)

*VAN DYKE, VERNON. PRIDE AND POWER: The Rationale of the Space Program. University of Ill., 285 p., 1964. $6.50. An analysis of the reasons, motives and goals behind the U.S. space program, especially the roles of national prestige and pride. (A)

*YOUNG, LOUISE B., editor. EXPLORING THE UNIVERSE. McGraw-Hill, 457 p., illus., 1963. $7.50. A collection of articles by 53 eminent scientists, scholars, and science writers ranging from Aristotle to today's space scientists. They discuss the nature of science, order in nature, the scientific method, theories and scientific truths, the creation of the universe, the possibility of life in the universe, and the philosophy of man's exploration of space. The material was compiled under a grant from the National Science Foundation to provide an adult understanding of today's scientific revolution and its effects on life. (A)

History of Space Flight

Books in this section present a history of rocket research and space exploration including the first launchings, animal experimentation in space, the pioneer astronauts and their accomplishments, and other major milestones in space. Asterisk (*) indicates title not listed in previous edition of the bibliography.

*AKENS, DAVID S. A PICTURE HISTORY: ROCKETS AND ROCKETRY. Strode, 228 p., illus., 1964. $5.95. Pictorial highlights of Project Mercury missions, Soviet manned space flight, and animal flights. Includes a chronology of rocketry. (U–S–A)

CAIDIN, MARTIN. OVERTURE TO SPACE. Duell, Sloan, and Pearce, 300 p., 1963. $5.50. A history of the first years of the Space Age including contributions of space pioneers, the establishment of the National Aeronautics and Space Administration, and the accomplishments of unmanned and manned spacecraft. (S–A)

CANBY, COURTLANDT. A HISTORY OF ROCKETS AND SPACE. Hawthorn, 112 p., illus., 1963. $5.95. An overall picture of the role rocket research has occupied and is likely to occupy in the history of mankind. Vol. 10 in the series "New Illustrated Library of Science and Invention". (A)

*DILLE, JOHN. AMERICANS IN SPACE. Harper, 155 p., illlus., 1965. $3.99. A history of our national space program through Project Mercury including a brief summary of the beginnings of rocketry on which our space program was founded. (I–U)

*EMME, EUGENE M. A HISTORY OF SPACE FLIGHT. Holt, 192 p., illus., 1965. Paperback, $1.96. A narrative of the dramatic efforts in the development of space flight on a worldwide basis. A concise history of major milestones in space. One of 14 volumes in the SPACE SCIENCE SERIES. (S)

*LEY, WILLY. MISSILES, MOONPROBES AND MEGAPARSECS. Signet, 189 p., illus., 1964. Paperback, 60 cents. A history of space exploration with emphasis on recent developments in the space age. Discusses the history of astronomy, the development of rocket propulsion, moon probes and the voyages of Ranger and Mariner spacecraft. (S–A)

Biography

Books in this section present the life stories of pioneer scientists and engineers in the fields of rocketry, space medicine, space technology, and astronomy. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*DAUGHERTY, CHARLES M. ROBERT GODDARD. Macmillan, 48 p., illus., 1964. $2.95. A child's biography of the father of modern rocketry. (I)

*GREGOR, ARTHUR S. GALILEO. Scribners, 192 p., illus., 1965. $3.50. The life and work of a pioneer of astronomy, written for children. (I–U)

*KNIGHT, DAVID C. COPERNICUS: TITAN OF MODERN ASTRONOMY. Watts, 192 p., illus., 1965. $2.95. A biography of a pioneer astronomer describing his education, environment, and accomplishments. (U–S)

*LAUBER, PATRICIA. BIG DREAMS AND SMALL ROCKETS. Crowell, 71 p., illus., 1965. $3.75. A short history of space travel with emphasis on the three "fathers of space travel"—Tsiolkovsky, Goddard, and Oberth. (I–U)

*LEHMAN, MILTON. THIS HIGH MAN. Farrar, 430 p., illus., 1963. $6.50. A biography of Robert H. Goddard, inventor of the modern rocket. (S–A)

NEWLON, CLARKE. FAMOUS PIONEERS IN SPACE. Dodd, Mead, 127 p., illus., 1963. $3.25. Brief biographies of 17 foremost pioneers in space: Goddard, Tsiolkovsky, von Karman, Oberth, von Braun, Van Allen, Ehricke, Schriever, cosmonauts and astronauts. (U–S)

*RATH, IDA ELLEN. THE STAR THAT DID NOT TWINKLE. Naylor, 134 p., illus., 1963. $4.95. The life of Clyde William Tombaugh, the discoverer of the planet Pluto. (U–S)

*RONAN, COLIN. THE ASTRONOMERS. Hill and Wang, 232 p., illus., 1964. $5. The lives, beliefs, and discoveries of pioneers of the science of astronomy who have made major contributions to our knowledge of the universe. Includes Pythagoras, Plato, Aristotle, Ptolemy, Copernicus, Kepler, Galileo, Newton, Halley, Einstein, and others. (S–A)

*ROWLAND, JOHN. THE RADAR MAN: The Story of Sir Robert Watson-Watt. Roy, 144 p., 1964. $3.50 A biography of radar's discoverer which focuses on the events that resulted in the discovery of radar and on the subsequent improvements and uses of radar. (U–S)

*SULLIVAN, NAVIN. PIONEER ASTRONOMERS. Atheneum, 156 p., illus., 1964. $3.75. Brief stories of past and present astronomers whose contributions have been important to the development of our knowledge of astronomy: Copernicus, Kepler, Galileo, Newton, Herschel, Bessel, Adams and Leverrier, Fraunhofer and Kirchoff, Huggins, Shapley and Hertzsprung, Hubble, Jansky and Reber, Smith and Baade. (U)

*THOMAS, SHIRLEY. MEN OF SPACE. Vol. 6, Chilton, 270 p., illus., 1963. $5.95. Brief biographies of ten scientists who are engaged in work that may lead to finding life in space—Abelson, Calvin, Drake, Fox, Lilly, Miller, Reynolds, Sagan, Urey, and Vishniac. (S–A)

*VERRAL, CHARLES S. ROBERT GODDARD, FATHER OF THE SPACE AGE. Prentice, 80 p., illus., 1963. $3.50. A child's biography of the U.S. pioneer of modern rocketry, told in narrative style. (I)

*WATERS, FRANK. ROBERT GILRUTH. Encyclopedia Britannica Press, 191 p., illus., 1963. $2.95. The role of the engineer in our nation's space program is exemplified in the life work of one of the foremost managers of Projects Mercury, Gemini, and Apollo. (S–A)

WINDERS, GERTRUDE H. ROBERT GODDARD: FATHER OF ROCKETRY. Day, 192 p., illus., 1963. $3.50. A young people's account of the life and work of "Moon Mad Goddard," and his contributions to the space age. (U)

Careers

Books in this section analyze the numerous new careers developing within the space program. They discuss qualifications, training, education, earnings and forecasts for future opportunities. Included are descriptions of the work of leading space scientists and engineers based on personal interviews or on talks before student groups. Asterisk (*) indicates title not listed in previous editions of the bibliography.

BINDER, OTTO. CAREERS IN SPACE. Walker, 308 p., illus., 1963. $3.50. A comprehensive survey of job opportunities in space technology. Discusses qualifications, training, earnings, and forecasts for future opportunities. (S)

*CARROLL, JOHN M. CAREERS AND OPPORTUNITIES IN ELECTRONICS. Dutton, 141 p., illus., 1964. $3.95. Discusses the expanding field of electronics and how it affects scientific, engineering and technological careers. Covers present and potential careers in electronics from radio repairman to Telstar engineer. (S)

*CHILDERS, ALBERT and JAMES S. LOVE, editors. LISTEN TO LEADERS IN SCIENCE. McKay, 278 p., 1965. $5.50. Eighteen of the world's great scientists discuss their own careers and the accomplishments of their scientific fields. (S–A)

*———. LISTEN TO LEADERS IN ENGINEERING. McKay, 338 p., 1965. $5.95. Twenty-two successful engineers and teachers of engineering discuss their experiences and engineering fields. (S–A)

*DEMBLING, MERWIN. SCIENTISTS ON SCIENCE. Dutton, 160 p., illus., 1965. $3.95. A selection of six talks to New York City science students given by working scientists who tell about and demonstrate the jobs they are doing. Discusses problem solving, electron tubes, solid-state physics, space technology, space propulsion and cryogenics. (S–A)

*LENT, HENRY B. YOUR PLACE IN AMERICA'S SPACE PROGRAM. Macmillan, 210 p., illus., 1964. $4.50. Descriptions of many different kinds of job opportunities in astronautics and our space program, based on interviews with numerous people working in these fields. Lists colleges and universities offering astronautics-related courses, job categories and salary ranges. (S)

*MCDONNELL, VIRGINIA. ASTRONAUTS' NURSE. Nelson, 126 p., illus., 1965. $2.75. The story of the Air Force nurse who was responsible for the daily health care of the seven Project Mercury astronauts and who subsequently has been designated as the first aerospace nurse. (U–S)

*MILLER, F. D. ASTRONOMY AS A CAREER. Bellman, approx. 25 p., 1962. Paperback, $1. A history of the profession together with helpful facts about an astronomy career, and a bibliography for further reading. (S)

NEAL, HARRY EDWARD. YOUR CAREER IN ELECTRONICS. Messner, 192 p., illus., 1963. $3.95. Describes electronic progress in communications, computers, medicine and other science fields in terms of career opportunities. (S)

*POOLE, LYNN and GRAY POOLE. SCIENTISTS WHO WORK WITH ASTRONAUTS. Dodd, 172 p., illus., 1964. $3.50. The work of 13 key men and women in 12 areas of science that are essential to the success of our space program: Homer Newell, Nancy Roman, Jocelyn Gill, Eugene Shoemaker, Ernst Stuhlinger, Wernher von Braun, Robert Gilruth, Richard Johnston, Maxime Faget, Warren North, Charles Berry, M.D., Christopher Kraft, Jr., and Kenneth Nagler. (S)

Miscellaneous

AERONAUTICS

Under this heading are listed new titles on aerospace-related aeronautical research. For a complete listing of books on aeronautics, see the NAEC Aviation Education Bibliography, described in the section on Bibliographies, page 22. Asterisk (*) indicates title not listed in previous editions of the bibliography.

*COOMBS, CHARLES. AEROSPACE PILOT. Morrow, 224 p., illus., 1964. $3.95. A narrative description of the experiences of a young man from the day he enters Officer Training School until he flies the X-15 as an aerospace research pilot. A guide to the training required for this vocation. (S-A)

*GALLANT, ROY A. MAN'S REACH INTO SPACE. Doubleday, 152 p., illus., rev., 1964. $3.95. Illustrates the relationship of high altitude flying to space travel—physical problems and how they may be overcome. While most of the book covers flight in the upper reaches of the atmosphere, man's preparations for flight in space are also discussed. (U-S)

*STAMBLER, IRWIN. SUPERSONIC TRANSPORT. Putnam, 64 p., illus., 1965. $2.29. Describes the development of America's design for the 2,000-mph airliner of tomorrow and the many difficult technical problems to be overcome before this airplane can become a reality. (U-S-A)

*SWANBOROUGH, F. G. VERTICAL FLIGHT AIRCRAFT OF THE WORLD. Aero, 120 p., illus., 1965. $6. Facts, figures and illustrations of today's many types of vertical flight aircraft from conventional helicopters to experimental convertiplanes. More than 50 aircraft from nine nations are included. (S-A)

LOOKING TO THE FUTURE

*BERGAUST, ERIK. THE NEXT FIFTY YEARS IN SPACE. Macmillan, 272 p., illus., 1964. $5.95. A look ahead in which the author discusses some of the problems as well as the possibilities of exploring the planets and colonizing space. The impacts of space exploration are described. (A)

*COLE, DANDRIDGE M. BEYOND TOMORROW. Space World, 168 p., illus., 1965. $7.50. A scientist's look ahead to the next 50 years of exploring space. (S-A)

OTHER

*BERGAUST, ERIK. ROCKET CITY, U.S.A. Macmillan, 216 p., illus., 1963. $4.95. The story of Huntsville, Ala., its rocket scientists and engineers, and their achievements. (S-A)

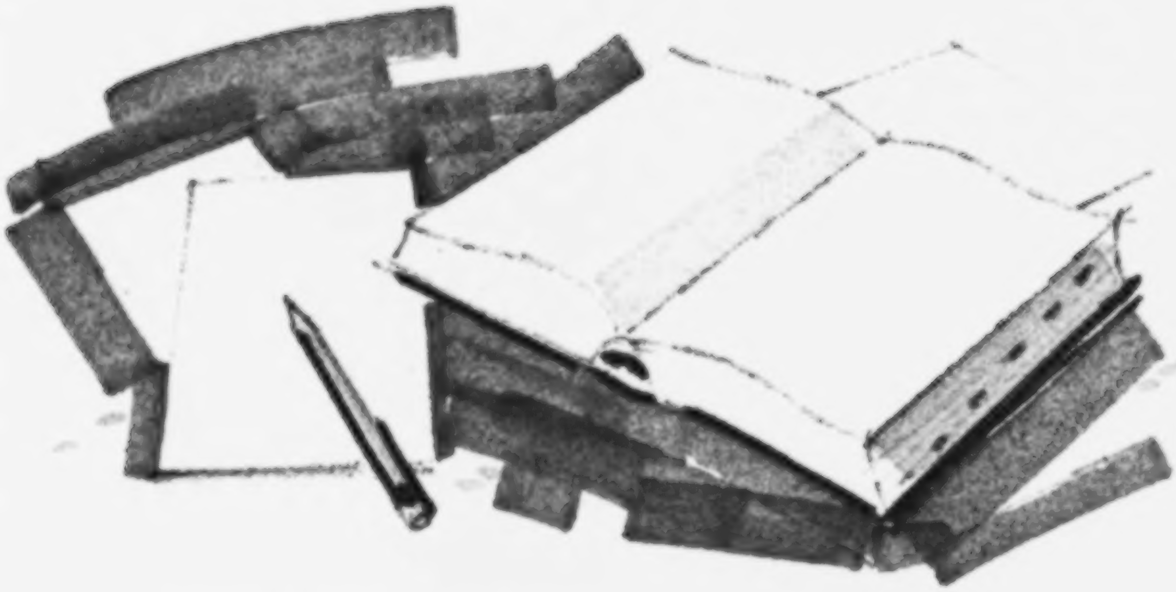
*FREEDMAN, RUSSELL. 2000 YEARS OF SPACE TRAVEL. Holiday House, 256 p., illus., 1963. $3.95. A survey of space travel facts and fancies of the past which shows how the discoveries and theories of scientists of the past have influenced space writers of their own and later times. (U-S)

*GLENN, JOHN. "P.S. I LISTENED TO YOUR HEART BEAT." Doubleday, 250 p., illus., 1964. $4.95. Selected letters sent to Astronaut John Glenn with comments by the astronaut. (S-A)

*HALACY, D. S., JR. BIONICS: THE SCIENCE OF "LIVING" MACHINES. Holiday, 192 p., illus., 1965. $4.50. An explanation of a new science that merges biology and engineering by adapting "life functions" to machines. Examples: heart stimulators and bacterial electric batteries. Some of this discussion is related to applications in future space exploration. (S)

——— CYBORG: EVOLUTION OF THE SUPERMAN. Harper, 207 p., 1965. $3.95. An explanation of the possibilities of "cyborg"—a coined word meaning man plus machines—and its implications for the future—especially for extended voyages and even colonization in space. (S-A)

*TRUSSELL, TAIT and PAUL [illegible], editors. DEAR NASA: PLEASE SEND ME A ROCKET. Dutton, 90 p., illus., 1964. $1.95. Letters from children received by NASA, with amusing line drawings. (A)



PART II • REFERENCES

PART II—REFERENCE MATERIALS

Asterisk (*) indicates title not listed in previous editions of the bibliography.

Atlases

*ATLAS OF THE MOON. VINCENT DE CALLATAY. St. Martin's 160 p., illus., translated from the French, 1964 (original French edition, 1962.) $15. Describes the moon's structure, motion and phases and includes a complete atlas of the moon's surface with detailed maps. Also discusses exploration by lunar spacecraft. (S–A)

MOON ATLAS. V. A. FIRSOFF. Viking, 32 p., illus. 1962. $10. A reference book that is both a general atlas and a report of the author's findings on the formative fractures of the lunar surface. (S–A)

*RECTIFIED LUNAR ATLAS. E. A. WHITAKER, G. P. KUIPER, W. K. HARTMANN, and L. H. SPRADLEY. Supplement No. 2 to the Photographic Lunar Atlas. University of Arizona Press, 143 p., illus., 1963. $35. Photographs of the entire visible lunar hemisphere as projected on a three-foot diameter globe to remove the major effects of foreshortening toward the limb. This technique reduces the overall contrast between the maria and the terrae and allows "the full dynamic range possessed by the printed plates to be applied to the retention of *local* contrast, both in the maria and on the terrae." (A)

Bibliographies

AAAS SCIENCE BOOK LIST FOR CHILDREN. HILARY J. DEASON, compiler. American Association for the Advancement of Science, 201 p., 2d ed., 1963. $2.50; paperback, $1.50. An evaluated and annotated list of 1,291 selected science titles for elementary school pupils. Includes books on astronomy and space travel. (P–I–U)

*AAAS SCIENCE BOOK LIST FOR YOUNG ADULTS, THE. HILARY J. DEASON, compiler. American Association for the Advancement of Science, 250 p., 1964. $3.50; paperback, $2.50. An enlarged and extensively revised replacement for the AAAS SCIENCE BOOK LIST published in 1959. Books listed are intended primarily for collateral reading and reference by students in grades 9 through 12. Numerous astronomy and space travel titles are included. (S)

Aeronautics and space Bibliographies. Superintendent of Documents. Selected, annotated lists of books on aviation and space flight, and sources of related teaching aids, films and filmstrips. (NASA Publications)

> AERONAUTICS AND SPACE BIBLIOGRAPHY FOR ELEMENTARY GRADES. 1961. #NAS 1.19:1. Listings cover books published from January 1958 through June 1961. 25 cents. (A)
>
> *AERONAUTICS AND SPACE BIBLIOGRAPHY FOR ELEMENTARY GRADES. Second ed., 1963. #NAS 1.9/2: Ae 8. Listings cover books published from January 1960 through March 1963. 30 cents. (A)
>
> AERONAUTICS AND SPACE BIBLIOGRAPHY FOR SECONDARY GRADES. 1961. #NAS 1.19: 2. Listings cover books published from January 1958 through June, 1961. 30 cents. (S–A)
>
> *AERONAUTICS AND SPACE BIBLIOGRAPHY FOR SECONDARY GRADES. Second ed. #NAS 1.9/2: Ae 8/2. Listings cover books published from January 1960 through March 1963. 35 cents. (S–A)
>
> AERONAUTICS AND SPACE BIBLIOGRAPHY: A Bibliography of Adult Aerospace Books and Materials. 1961. #NAS 1.19: 3. Listings include books published from January 1958 through June 1961. 30 cents. (A)
>
> *AERONAUTICS AND SPACE BIBLIOGRAPHY: ADULT AEROSPACE BOOKS AND MATERIALS. Second ed., 1963. #NAS 1.9/2: Ae 8/3. Listings cover books published from January 1960 through March 1963. 30 cents. (A)

AEROSPACE MEDICINE AND BIOLOGY: AN ANNOTATED BIBLIOGRAPHY. ARNOLD J. JACOBIUS, ROMAN KENK and OTHERS, compilers. A bibliography of world literature on aviation and space medicine subjects: space biology, ecology, psychology, sensory mechanisms, physiology, psychiatry, stress physiology, toxicity, accidents, safety, etc. Includes author, source and subject indexes.

> *Vol. VI, 1957 Literature. #AD402638. 365 p., 1,566 abstracts. 1963. Clearing House, $5. (A)
>
> Vols. VII–X, 1958–61 Literature, in preparation.
>
> *Vol. XI, 1962–63 Literature. #N65-21424.494 p., 2,335 abstracts. 1965. Clearing House. $5. (A)
>
> (Vols. I and II—*Aviation Medicine: An Annotated Bibliography*, and Vols. III–V–*Aerospace Medicine and Biology: An Annotated Bibliography*, covering literature for the years 1952–56, are also available from The Clearing House at various prices.) (A)

*AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY. Clearing House. Published at intervals throughout the year. For further information and price, write to The Clearing House. (A)

ANNOTATED BIBLIOGRAPHY OF SPACE SCIENCE AND TECHNOLOGY. FREDERICK I. ORDWAY, III, editor. Arfor, 77 p., revised 1962. Paperback, $2.95. A list, by year of publication, of the literature of space science and technology, 1931 through 1961. Includes an Astronomical Supplement. (S–A)

*AVIATION EDUCATION BIBLIOGRAPHY. National Aerospace Education Council, 64 p., 4th ed., 1964. Paperback, 25 cents. An annotated, graded list of aviation books, references, periodicals, free and inexpensive teaching aids, films and filmstrips on such subjects as aviation history and biography, types of aircraft, aviation weather, air transportation, learning to fly, military aviation, and the theory of flight. Books include those published in the period 1959 through spring, 1964.

*GUIDE TO SCIENCE READING, A. HILARY J. DEASON, compiler. Signet, 221 p., rev., 1963. Paperback, 60 cents. A comprehensive, annotated and graded guide to more than 900 paper bound science books. Books range in difficulty from those that can be understood by students in the upper elementary grades to those which require considerable introductory background in science and mathematics. Numerous astronomy and space science books are included. (U–S–A)

LIST OF SELECTED REFERENCES ON NASA PROGRAMS. 236 p., 1962. #NAS 1.21:3. Available from Superintendent of Documents, U.S. Government Printing Office, $1.25. A selected list of publications and releases of the National Aeronautics and Space Administration issued during the 3 years following the Agency's establishment in October, 1958. Includes listings of technical reports; notes and translations; releases; speeches; general informational and educational publications; and congressional documents relating to NASA activities. (A)

*SPACE SCIENCE AND TECHNOLOGY. BERNARD M. FRY and FOSTER E. MOHRHARDT. Vol. I of *Guides to Information Sources in Science and Technology*. Wiley, 579 p., 1963. $9.50. An annotated bibliography with both subject and authors' indexes. Lists books, reports, papers, conference proceedings, reprints, journals, etc. some of which are of a non-technical nature. Subjects covered include satellites, environmental and medical factors, Soviet astronautics, space law, space flight, propulsion and propellants, U.S. space programs. (A)

Chronologies

AERONAUTICS AND ASTRONAUTICS 1915–60. EUGENE M. EMME. Superintendent of Documents, U.S. Government Printing Office, 240 p., 1961. #NAS 1.2:Ae 8/915-960. $1.75. A chronological list of achievements in scientific research and engineering development which lie behind the major milestones in man's conquest of the air and space. Appendices include a log of earth satellites and space probes through 1960, and major astronautics awards and honors over the years. (S–A)

AERONAUTICAL AND ASTRONAUTICAL EVENTS OF 1961. EUGENE M. EMME. Committee on Science and Astronautics, U.S. House of Representatives, 113 p., 1962. *Out of print.* A sequel to Eugene Emme's chronological list of aerospace achievements from 1915 through 1960—*Aeronautics and Astronautics 1915–60.* An inventory of decisions, announcements, technical progress and flight achievements in 1961. (S–A)

*ASTRONAUTICAL AND AERONAUTICAL EVENTS OF 1962. EUGENE M. EMME. Superintendent of Documents, 370 p., 1963. #Y 4.Sci 2:Ae 8/962. $1. Report of NASA to the Committee on Science and Astronautics, on the activities, problems, and accomplishments of NASA and its academic, industrial, governmental and international partners in the exploration of space during 1962. Also includes a chronology of major NASA launchings from 1958 through 1962. (S–A)

*ASTRONAUTICS AND AERONAUTICS, 1963: CHRONOLOGY ON SCIENCE, TECHNOLOGY, AND POLICY. EUGENE M. EMME, Superintendent of Documents, 610 p., $2. 1964. #NAS 1.21:4004. Known events related to scientific, technological, organizational and policy aspects of space exploration and exploitation. Also includes a list of 1963 satellites, space probes and manned space flight, and major 1963 NASA launchings. (S–A)

*ASTRONAUTICS AND AERONAUTICS 1964: CHRONOLOGY ON SCIENCE, TECHNOLOGY AND POLICY. EUGENE M. EMME. Superintendent of Documents, approx. 550 p., 1965. #NAS 1.21:4005. $1.75. A chronology of events and statements of the seventh year of the Space Age, compiled from open public sources. (S–A)

CHRONOLOGY OF MISSILE AND ASTRONAUTIC EVENTS, A. CHARLES S. SHELDON, II. Superintendent of Documents, #87/1:H.rp. 67., 189 p., 1961. 55 cents. A comprehensive list of significant events in missilery and astronautics from 1686, when Sir Isaac Newton described how an earth satellite is placed in orbit, through Feb., 1961. Includes dates of decisions affecting U.S. space efforts, important launchings, progress reports, predictions for the future, etc. (S–A)

Dictionaries

ABC's OF ASTRONOMY, THE. ROY A. GALLANT. Doubleday, 128 p., illus., 1962. $3.95. An illustrated dictionary explaining more than 500 astronomical terms in simple language. Also includes reference maps, a sky map, and instructions for using a telescope effectively. (S–A)

***AEROSPACE AGE DICTIONARY, THE.** CLARKE NEWLON, compiler. Watts, 282 p., 1965. $5.95. A comprehensive, quick-reference dictionary of aerospace technical terms that the general reader as well as the specialist can use. Appendices include brief biographies of persons having major roles in our civilian and military space programs, locations and purposes of NASA centers, military units involved in the space program, conversion factors and units of measurements. (S–A)

***ASTRONOMY POCKET CRAMMER.** CHARLES M. HUFFER. Doubleday, 159 p., illus., 1963. Paperback, $1. A pocket size dictionary of astronomy. (S–A)

AVIATION AND SPACE DICTIONARY. ERNEST J. GENTLE and CHARLES E. CHAPEL, editors. Aero, 445 p., illus., revised 1961. $11. Comprehensive definitions of more than 10,000 aerospace terms. (U–S–A)

***COMPTON'S ILLUSTRATED SCIENCE DICTIONARY.** CHARLES A. FORD, editor. Compton, 632 p., illus., 1963. School and library price, $13.25. Definitions of 3,500 words and terms used in school science courses plus those found in technical articles appearing in non-scientific publications. Covers words and terms from 14 scientific areas including astronautics and astronomy. 1500 illustrations. For each word or term, the pronunciation is given, its meaning is defined, the scientific field to which it belongs is identified and its use is demonstrated in sentence form. (U–S–A)

MAN-IN-SPACE DICTIONARY, THE. MARTIN CAIDIN. Dutton, 256 p., illus., 1963. $6.95. Definitions and nontechnical explanations of 1900 terms dealing with the science and technology of manned spaceflight. (S–A)

***SPACE AGE DICTIONARY.** CHARLES MCLAUGHLIN, editor. Van Nostrand, 233 p., illus., revised 1963. $7.95. Concise, simple and clear definitions of space age terms relating to rockets, missiles, launch vehicles, satellites and space flight. Includes a chronology of manned space flights and tables of NASA's major launchings. (S–A)

***YOUNG PEOPLE'S SCIENCE DICTIONARY.** Children's, 240 p., illus., 1964. $6.60. 6500 terms from all physical and biological sciences, with phonetic pronunciation and noun, verb and adjective forms of all vital words. Many space terms included. (I–U)

Encyclopedias

*ASIMOV'S BIOGRAPHICAL ENCYCLOPEDIA OF SCIENCE AND TECHNOLOGY. ISAAC ASIMOV. Doubleday, 662 p., illus., 1964. $8.95. Biographies of the world's great scientists and inventors arranged chronologically in order of birth. Covers the entire sweep of history with greatest emphasis on scientists of the 19th and 20th centuries, including the space age. (S–A)

*ASTRONOMY A TO Z. LLOYD MOTZ, editor. Grosset, 331 p., illus., 1964. $4.75. Available also in paper covers, $2.50. An encyclopedia of astronomical information, from "abberation" to "zodiacal light," brought up to date with the findings of space probes and radio telescopes. (S–A)

*ENCYCLOPEDIA OF SPACE SCIENCE. Theodore Audel and Company, 4 volumes. 1963. Explanations and illustrations of thousands of space science terms involving astronautics, telemetry, electronics, rocketry, spacecraft, space vehicles, and many other subjects. $19.95. (U–S)

*ILLUSTRATED SPACE ENCYCLOPEDIA. ERIK BERGAUST. Putnam, 188 p., illus., 1965. $3.95. A dictionary/encyclopedia of space terms, including tables and specifications for the various satellites and launch vehicles, a chronology of manned space programs, a condensed log of space projects, a list of space abbreviations, and astronaut biographies and photographs. (U–S)

LAROUSSE ENCYCLOPEDIA OF ASTRONOMY. LUCIEN RUDAUX and G. DE VAUCOULEURS, editors. Putnam, approx. 400 p., revised 1962. $17.50. A revised edition of the first encyclopedia devoted entirely to astronomy, with more than 800 illustrations. (S–A)

*McGRAW-HILL ENCYCLOPEDIA OF SCIENCE AND TECHNOLOGY. McGraw-Hill, 15 volumes, 1960. Seventy articles on space science subjects listed alphabetically from apogee to weightlessness. Yearbooks are also available presenting new developments since the original 1960 edition was published. School and library price of 1960 edition, $136.17. New edition (1965–1966) in preparation. (S–A)

*SCIENCE YEAR. Field Enterprises Educational Corp., illus., 1965. $6.95. A summary of man's current adventures in the space, earth, and life sciences. Space science selections discuss such topics as the voyage to Mars, Russian space science, and the race for space. First of a series of current science summaries to be issued annually. (I–U–S)

Miscellaneous Special References

AERONAUTICAL AND SPACE SERIAL PUBLICATIONS: A WORLD LIST. 255 p., 1962. LC33.2: Ae 8/3. Available from the Superintendent of Documents, U.S. Government Printing Office. $2. Includes names, addresses, and publishers of more than 4,500 periodicals, annuals, yearbooks, documents, etc., issued serially, most of which are nontechnical. The list represents periodicals from 76 countries. (A)

*AEROSPACE FACTS AND FIGURES. 1965 Edition. Aero, 132 p., illus., 1964. $3. A statistical and textual review of the aerospace industry for 1964. Covers production, manpower, space programs, research and development, general aviation, air transportation and military aviation. (S–A)

*INTERAVIA ABC. WORLD DIRECTORY OF AVIATION AND ASTRONAUTICS. Interavia. Approx. 1350 p., published anually. $14. Listings covering the world's aerospace manufacturers, government aerospace agencies, aerospace organizations, schools, periodicals, and many other segments of the aerospace world. (A)

*RANGER VII PHOTOGRAPHS OF THE MOON. Superintendent of Documents.

Pt. I: Camera "A" series. 1964. #NAS 1.21: 61. 17 p., and 199 plates. $6.50. A selection of 199 photographs taken by the "A" camera from 1,300 to 3 miles altitude above the surface of the moon. (S–A)

Pt. II: Camera "B" series. 1965. #NAS 1.21:62. 17 p., and 200 plates. $6.50. (S–A)

Text included in the above listed Pts. I and II discusses the Ranger mission and trajectory and impact area selection, and describes the television camera, receiving and recording equipment aboard.

*SPACE-AGE ACRONYMS. RETA C. MOSER. Plenum, 427 p., 1964. $17.50. More than 10,000 acronyms and 17,000 definitions. The largest compilation of exclusively technical and industrial acronyms available. Cross referenced. (S–A)

*SPACECRAFT AND BOOSTERS. K. W. GATLAND, editor. Aero 296 p., illus., 1964. $14. Comprehensive analysis of more than 70 U.S. and Soviet space launchings for the year 1961. Information includes launch data and time, dimensions, weight, objectives, payload and results of spacecraft launches. A second section describes the booster vehicles—thrust, propellant, type of engine, burning time, etc. (S–A)

SPACE SCIENTISTS AND ENGINEERS. Selected Biographical and Bibliographical Listings, 1957–1961. 332 p., 1962. #NAS 1.21:5. Available from Superintendent of Documents, U.S. Government Printing Office. $2. Brief biographies of approximately 1,000 scientific personnel making contributions to the advancement of space science and technology, together with listings of their technical papers and published articles. Subject and author indexes are included. (A)

*SPACE WORLD YEARBOOK. Palmer, 110 p., illus., 1965. $5. Chronology of all space launchings, 1958–1964, including mission, launch vehicle, apogee, perigee, decay date, etc., and other facts and figures on the space program. Many color photographs and black and white pictures plus specifications of major satellites and launch vehicles. (U–S–A)

UNITED STATES AIRCRAFT, MISSILES AND SPACECRAFT. JAMES J. HAGGERTY, JR., editor. National Aerospace Education Council, approx. 168 p., illus., issued annually. Paperback, $2. A pictorial review of all U.S. aircraft, missiles and spacecraft currently in production. Includes photographs, specifications, performance data and comments; aerospace records and awards and significant aerospace events for the year. (U–S–A)

*WHO'S WHO IN SPACE. Space Publications. Published annually. $26. A biographical reference book of leaders in the space/defense community. (S–A)

WORLD SPACE DIRECTORY. DONALD W. DEAN, editor. American Aviation Publications, approx. 625 p., published semiannually, $12.50. Lists of officers and addresses of U.S. major and component missile/space manufacturers; U.S. Government and foreign government agencies involved in missile/space programs; academic, nonprofit research and professional organizations; and colleges and universities offering courses related to missile/space research and manufacturing. (S–A)

General References for Elementary and Secondary School Students

BOOK OF KNOWLEDGE, THE. Grolier, Inc. 20 vols., revised annually. Material on all phases of space exploration and research is included. Discount to schools and libraries. (I–U)

BOOK OF POPULAR SCIENCE, THE. Grolier, Inc., 10 vols. Full coverage of space exploration and related fields. Discount to schools and libraries. (U–S)

BRITANNICA JUNIOR. Encyclopaedia Britannica, 15 vols., revised annually. Includes numerous references to space and space exploration—rockets, missiles, astronomy, spacecraft, etc. Yearbook service available. School and library price, $101.90. (I–U)

CHILDCRAFT. Field Enterprises Educational Corp. 15 vols., illus., Volume 3, "World and Space" includes articles on numerous space travel topics: weightlessness, space capsules, rockets, astronauts, spacecraft guidance, space communications, etc. School and library price, $89. (P)

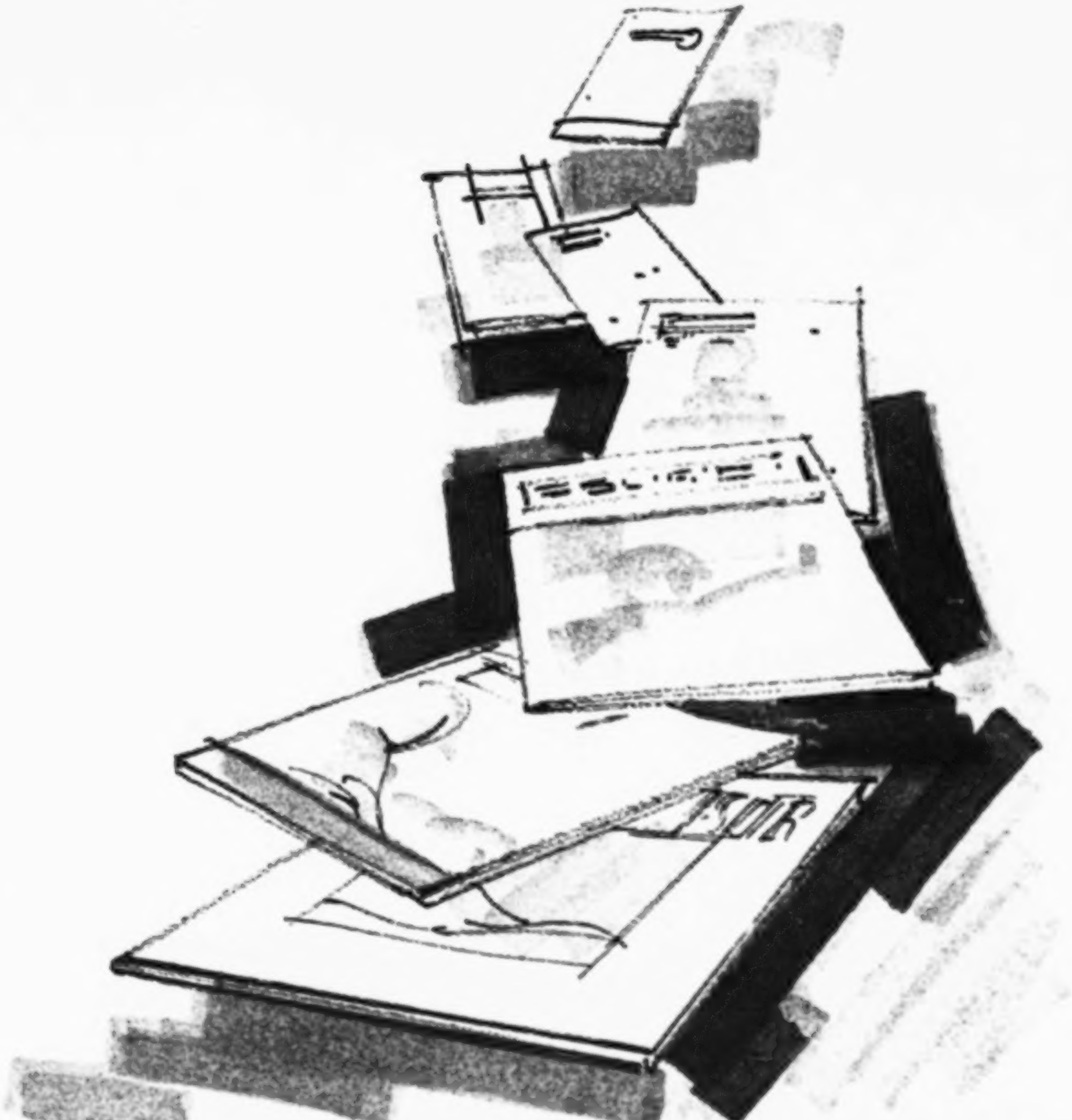
COMPTON'S PICTURED ENCYCLOPEDIA. F. E. Compton Company, 15 vols. Includes many well illustrated articles on a large variety of space and astronomy subjects: aerospace medicine, aerospace fuels, aerospace research and development, astronomy, rockets, space travel, guided missiles, stars, telescopes, radiation, planets, moon, nebulae, etc. Bibliography follows articles on astronomy and space travel and the section on astronomy also includes a Reference Outline. School and library price, $124. (I–U–S)

ENCYCLOPEDIA AMERICANA. Grolier, Inc., 30 vols. The 1965 edition includes numerous references to current space activities such as the Ranger VII spacecraft photographic mission to the moon and a revised section on astronauts. Discount to schools and libraries. (U–S–A)

ENCYCLOPAEDIA BRITANNICA. Encyclopaedia Britannica, 24 vols., revised annually. Includes both general and technical information on numerous aspects of astronautics and space exploration. Yearbook service available. School and library price, $254. (U–S–A)

WORLD BOOK ENCYCLOPEDIA. Field Enterprises Educational Corp. 20 vols., revised annually. Includes numerous references to space and astronomy subjects: artificial satellites, orbits, rockets, space communications, launching operations, flying a spacecraft, space stations, manned and unmanned spacecraft, launch vehicles, interplanetary space travel, space probes, etc. An accompanying Reading and Study Guide suggests further topics for reading. School and library price, $124. (I–U–S)

YOUNG PEOPLE'S SCIENCE ENCYCLOPEDIA. Children's Press, 22 vols., illus. The 1964 supplement, *New Frontiers In Science*, includes references and articles on the X–15, astronaut training, Projects Mercury, Gemini and Apollo, man in orbit, space flight to the moon, bases on the moon, investigating the planets, missile guidance systems, rockets, new knowledge by satellite, and communication by satellite. School and library price, $59.85. 1964 Supplement only, $6.60. (I–U)



PART III • PERIODICALS

PART III—PERIODICALS

AVIATION WEEK AND SPACE TECHNOLOGY. c/o Fulfillment Manager, P.O. Box 430, Highstown, N.J., 08520. Published weekly, $8 per year. Single copies, 75¢. Subscriptions solicited only from management men, engineers, scientists, and military officers having a commercial or professional interest in aviation, including missiles and space technology. Position and company connection must be indicated on subscription orders. Available also to public libraries. Subjects covered: Aeronautical Engineering, Space Technology, Avionics, Air Transport, Management, Finance. (A)

CURRENT SCIENCE. American Education Publications. Education Center, Columbus, Ohio, 43216. Published weekly during the school year—32 issues. $1.40 per year. Club rates for 10 or more subscriptions sent to the same address, 70 cents per subscription per year. An 8-page leaflet for junior high school students giving current news about scientific developments. Space flight subjects and space age news are featured regularly. (U–S)

INTERAVIA WORLD REVIEW OF AVIATION AND ASTRONAUTICS. Interavia, 185 Madison Ave., New York, N.Y., 10016. Published monthly with three or four supplements each year. 6 mos., $7; 1 year, $12; 2 years, $20. Reports on important developments in aviation and space industries, space research, electronics and all associated fields in the aerospace world. (A)

MISSILES AND ROCKETS. American Aviation Publications, 1001 Vermont Ave. NW., Washington, D.C., 20005. Published weekly, $5 a year. Technical and general news of defense and space exploration projects. Available only to libraries and to professional personnel engaged in the missile/space industry. (S–A)

MODEL ROCKET NEWS. Box 227, Penrose, Colo., 81240. Six issues per year, $1. A newsletter containing the latest developments in model rocketry, safety tips, and technical information. (U–S–A)

REVIEW OF POPULAR ASTRONOMY. Sky Map Publications, 214 South Bemiston, St. Louis, Mo., 63105. Published six times a year. $4 per year, $7 for 2 years for United States, Canadian and Mexican subscriptions. All other countries, $1 additional per year for extra postage costs. Of interest to amateur astronomers. Articles, easy-to-use monthly sky and planet charts, space science department, satellite-finder charts, and telescope making directions. (S–A)

ROCKET-JET FLYING. 50 East 42d St., New York, N.Y. Published quarterly, $7 per year; $10 per year, foreign. An "ideas" publication devoted to the advancement of rocketry. Includes information on newest developments in rocketry and data useful in calculating the design of reaction engines. (A)

SCIENCE. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D.C., 20005. Published weekly. $8.50 per year. School year subscriptions, $7 for 9 mos., $7.50 for 10 months. Outstanding articles on newsworthy scientific happenings, discussions on vital issues and presentations of scholarly reports and scientific papers. (A)

SCIENCE BOOKS: A QUARTERLY REVIEW. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D.C., 20005. Published quarterly. $4.50 a year: additional subscriptions to the same address, $3 a year. Critical evaluations of science and mathematics books promptly after publication. Space titles and astronomy books included. (A)

SCIENCE NEWS LETTER, 1719 N St. NW., Washington, D.C., 20036. Published weekly. $5.50 per year. A weekly summary of current events in science—new experiments and findings. Many articles on space research and exploration. (S–A)

SKY AND TELESCOPE. Sky Publishing Corporation, 49-50-51 Bay State Road, Cambridge, Mass., 02138. Published monthly. $6 per year, United States; $7 per yr., Canadian and South American; $8 per year foreign. Covers wide range of topics of interest to both amateur and professional astronomers. (S–A)

SKYLIGHTS. National Aerospace Education Council, 806 15th St., NW., Washington, D.C., 20005. Published 9 times a year (September through May). Single subscriptions free to teachers and librarians requesting it on school or library stationery. Six-page nontechnical leaflet covering current events and developments in aviation and space, unusual facts and figures, historical items and aviation/space education news and announcements. (U–S–A)

SPACEFLIGHT. Sky Publishing Corporation, 49-50-51 Bay State Road, Cambridge, Mass., 02138. Published six times a year. $3.50 per year. A popular and authoritative magazine on rockets, astronautics, and space travel astronomy written for the layman and published by the British Interplanetary Society. Nontechnical language. (S–A)

SPACE WORLD. Ray Palmer, publisher. P.O. Box 388, Amherst, Wis., 54406. Published monthly. $5 per year. Complete coverage of our nonmilitary space program, fully illustrated. Scientific data also covered. (S–A)

STUDENT ROCKETEER, THE. Rocket Research Institute, 3262 Castera Ave., Glendale 8, Calif. Published quarterly, $1 per year. Designed for student rocket clubs. (S–A)

PART IV • TEACHING AIDS

PART IV—TEACHING AIDS

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RESULTS OF THE THIRD UNITED STATES MANNED ORBITAL SPACE FLIGHT. Oct. 3, 1962. 120 p., illus., 1962. NAS 1.21:12. Spacecraft and launch vehicle performance, pilot report, medical analysis, and mission operations. 70 cents. (S–A)

SATELLITE INFORMATION CARDS. 1963. #NAS 1.2:Sa 8/2. Six cards, each 2¼ x 3⅝ in. with photographs of OSO, Nimbus, Syncom, Ariel I, TIROS and OGO with brief descriptions. 15 cents per set. (U–S–A)

THE SEARCH FOR EXTRATERRESTRIAL LIFE. 20 p., illus., 1963. #NAS 1.19:10. The methods, devices, and implements being used to search for life forms on planets of our solar system. 20 cents. (S–A)

SHORT GLOSSARY OF SPACE TERMS. 1962. 57 p., #NAS 1.21:1. Brief definitions of technical terms used frequently by space scientists and engineers. 25 cents. (U–S–A)

UNITED STATES ASTRONAUTS. Document No. 42, U.S. Senate, 88th Cong., 1st session. 79 p., illus., 1963. Brief biographies and photographs of the second and third group of NASA astronauts selected in September, 1962 and in October, 1963 plus U.S. Air Force X20 pilots selected in Sept., 1962. 35 cents. (U–S–A)

WHAT'S UP THERE, A SOURCE BOOK IN SPACE ORIENTED MATHMATICS FOR GRADES 5–8. 1964. Student edition, 144 p. #NAS 1.2:W 55/student. $1. Teachers' edition, 144 p. #NAS 1.2:W 55/teacher. $1.

A WORLD IN SPACE. 20 p., illus., 1963. #NAS 1.23:B–2–63. Briefly discusses geophysics in space, new astronomy, the universe, life in space, manned space flight, engineering in space, space environment, space measurements and space phenomena on earth. 15 cents. (S–A)

X–15 RESEARCH RESULTS WITH A SELECTED BIBLIOGRAPHY. 128 p., illus., 1965. NAS 1.21:60. A semitechnical summary of the X–15 rocket-powered aircraft program directed toward the less publicized aspects of its achievements. 55 cents. (S–A)

Teachers Publishing Corp., 23 Leroy Ave., Darien, Conn., 06820

SPACE. A 96-page handbook for the teaching of elementary grade science prepared under the sponsorship of the National Science Teachers Association and NASA. Helps teachers to incorporate space science into the science curriculum. Suggests 80 activities to "create an atmosphere in which children enthusiastically explore, experiment, and speculate about the universe from the vantage point of their space station: the Earth." Material and experiments are arranged from the simple to the more complex. $1.95. (A)

Trippensee Planetarium Co., 2200 South Hamilton St., Saginaw, Mich., 48602

ELEMENTS OF ASTRONOMY AND PHYSICAL GEOGRAPHY. A 176-page book with textbook explanations combined with suggestions for using a Trippensee planetarium to demonstrate the motions in the solar system. $1.50. (U–S–A)

WORLDS IN MOTION. Basic facts of astronomy with suggestions for using Trippensee solar models. $1. (U–S–A)

U.S. Department of Labor, Bureau of Labor Statistics, Washington, D.C., 20210

SCIENCE AND YOUR CAREER. A leaflet discussing the role of science in numerous careers and suggesting ways in which young people can obtain information about science-oriented careers. Free. (S)

STRANGE NEW WORLD. A reprint from the *Occupational Outlook Quarterly* describing the work of the National Aeronautics and Space Administration and the kinds of jobs to be found within our national space program, both in NASA and in the supporting aerospace industry. Free. (S)

William-Frederick Press, 55 East 86th St., New York, N.Y., 10028

FABULOUS FIFTEEN YEARS AHEAD, THE. Predictions regarding space projects now in the planning stages. 25 cents. (S–A)

KEEP PACE WITH PROGRESS. New frontiers opening up in the space sciences. 25 cents. (S–A)

OPERATION MOON. A discussion of America's plans for manned exploration of the moon. 25 cents. (S–A)

SPACE RESEARCH: HOW IT'S CHANGING OUR LIVES. The effects of the space program on our lives—our health, education, weather, homes, etc. 25 cents. (S–A)

WAY STATIONS IN SPACE—THE PLANETS. What we may find as we explore the planets. Possible spacecraft that may be used for exploration. 25 cents. (S–A)

AN ENGINEERING CAREER FOR YOUR SCHOOL-AGE CHILD. Stresses the need for early preparation and the importance of specialized knowledge in training for a space age career in engineering. 25 cents. (A)

Aerospace Industries Information Sources

Below are listed the names of aerospace industry companies having free pamphlets, pictures, booklets, charts, or free loan films, etc. for distribution to teachers. In order to best serve both teachers and companies, the sources are listed under specific subject headings. Requests for single copies of printed materials should be made on school or library stationery. When inquiring about the availability of free loan films, ask first for the list of films and loan instructions. The addresses of the companies appear at the end of this section on pp. 45 and 46.

General Space Information

Douglas Aircraft Co.
Fairchild-Hiller Corp.
General Electric Co.
General Precision Equipment Corp.

Communications Satellites

Douglas Aircraft Co.
RCA
TRW Systems

Control, Command and Sensing Devices

Bendix Corporation
General Precision Equipment Corp.

Guidance—Navigation

AC Spark Plug Division
General Precision Equipment Corp.
Sperry Gyroscope Co.

Launch Vehicles

Douglas Aircraft Co.
Ling-Temco-Vought, Inc.
United Technology Center

Meteorological Satellites

Douglas Aircraft Co.
Fairchild-Hiller Corp.
RCA

Navigational Satellites

Douglas Aircraft Co.
Kollsman Instrument

Project Apollo

Grumman Aircraft Engineering Corp.
Kollsman Instrument

Project Gemini

International Business Machines
Sikorsky (film—astronaut recovery by helicopter)

Rocket Engines

Aerojet General Corp.
Hercules Powder Co.
Thiokol Chemical Corp.
TRW Systems
United Technology Center

Solar Cells

Douglas Aircraft Co.
Fairchild-Hiller Corp.

Space Probes

Douglas Aircraft Corp.
Fairchild-Hiller Corp.
Kollsman Instrument Corp.
Ling-Temco-Vought, Inc.
TRW Systems

Space Simulators

Douglas Aircraft Co.
General Electric Co.
General Precision Equipment Corp.
International Business Machines Corp.
Ling-Temco-Vought, Inc.

Supersonic Transport

General Electric Co.
Shell Oil Co.

V/STOL Aircraft

Fairchild-Hiller Corp.
General Electric Co.
Ling-Temco-Vought, Inc.

Miscellaneous

Aluminum—properties and uses of aluminum in aerospace
Aluminum Company of America

Data Storage and Retrieval
General Precision Equipment Corp.

Modular Maneuvering Units (MMU)
Ling-Temco-Vought, Inc.

Sonic Boom
Shell Oil Co.

Space Electronics
RCA

Special Devices—Actuators and explosive bolts
Hercules Powder Co.

Telemetry
RCA

Addresses to which requests should be sent for free materials on the above listed subjects

AC Spark Plug Division, General Motors Corp., c/o Public Relations, 7929 S. Howell Ave., Milwaukee, Wis., 53201

Aerojet-General Corporation, c/o Public Relations, 9100 East Flair Drive, El Monte, Calif., 91734

Aluminum Company of America, 1501 Alcoa Building, Pittsburgh, Pa., 15219

The Bendix Corporation, Eclipse-Pioneer Division, Teterboro, N.J., 07608

Douglas Aircraft Co., Inc., Public Relations C1-250, 3000 Ocean Park Blvd., Santa Monica, Calif., 90406—FOR PAMPHLETS AND CHARTS ONLY

Douglas Aircraft Co., Inc., Marketing Communications, Film Productions C1-250 (C1-250), 3000 Ocean Park Blvd., Santa Monica, Calif., 90406—FOR FILMS ONLY.

Fairchild-Hiller Corporation, c/o Steven C. Paton, Asst. Director, Communications, 1725 I St. NW., Washington, D.C.

General Electric Company, Missile and Space Div., c/o J. C. Hoffman, Manager, Product Information, P.O. Box 8555, Philadelphia, Pa., 19101—FOR SPACE INFORMATION ONLY.

General Electric Company, c/o Mr. Grant Martin, Flight Propulsion Division, Cincinnati, Ohio, 45215 OR General Electric Company, c/o Mrs. Virginia M. Wilks, Flight Propulsion Division 2-40, Lynn, Mass., 01905—FOR INFORMATION ABOUT V/STOL AIRCRAFT, JET PROPULSION, AND THE SUPERSONIC TRANSPORT ONLY

General Precision Equipment Corporation, c/o Mr. Norman Wicks, Tarrytown, N.Y., 10591

Grumman Aircraft Engineering Corp., c/o Public Relations, Bethpage, Long Island, N.Y.

Hercules Powder Co., c/o Richard B. Douglas, Wilmington, Del., 19899

IBM Corporation, c/o Manager of Public Relations, 326 E. Montgomery Ave., Rockville, Md.

Kollsman Instrument Corporation, 80-08 45th Avenue, Elmhurst, N.Y., 11373

Ling-Temco-Vought, Inc., c/o News Bureau, P.O. Box 5003, Dallas, Tex., 75222

RCA, c/o Nicholas F. Pensiero, Manager, Defense Marketing Services, RCA Bldg. 2-6, Camden, N.J., 08102

Shell Oil Company, Public Relations Dept., 50 West 50th St., New York, N.Y., 10020

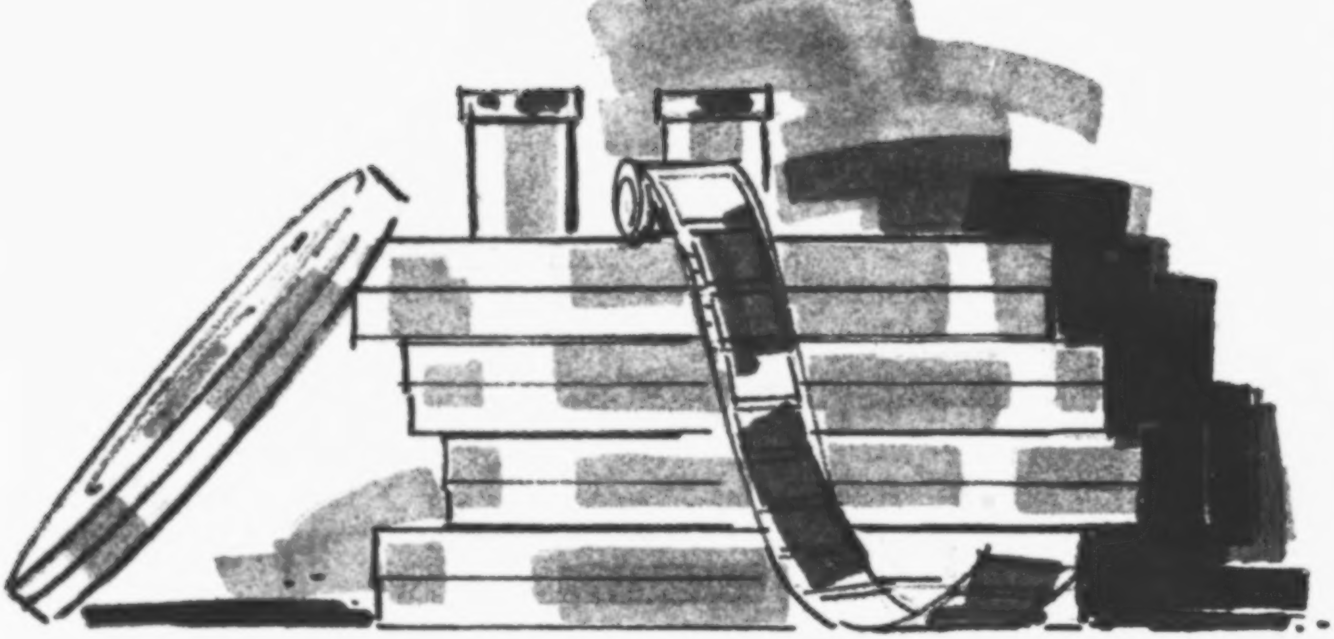
Sikorsky Aircraft, Division of United Aircraft Corp., c/o Frank J. Delear, Public Relations Mgr., Stratford, Conn.

Sperry Gyroscope Co., Public Relations Dept. (2B120), Great Neck, N.Y.

Thiokol Chemical Corporation—Wasatch Division, c/o Manager, Public Relations, Brigham City, Utah, 84302

TRW Systems, c/o Public Relations, One Space Park, Redondo Beach, Calif.

United Technology Center, c/o Public Relations, P.O. Box 358, Sunnyvale, Calif.



PART V • FILMS AND FILMSTRIPS

PART V—FILMS AND FILMSTRIPS

Films

Films listed below are 16 mm., sound productions in color or in black and white as indicated. They are loaned free or are for sale at the prices listed. However, many of the latter are also available for rental. Consult your nearest educational film rental library, or write to the seller for the location of the film library handling specific films. For additional free loan films, see the Aerospace Industries Information Sources listed on page 45 of this Bibliography.

Association Films. Order from nearest Exchange Center as follows: Broad at Elm, Ridgefield, N.J., 07657; 561 Hillgrove Ave., La Grange, Ill., 60525; 324 Delaware Ave., Oakmont, Pa., 15139; 1621 Dragon St., Dallas, Tex., 75207; and 25358 Cypress Ave., Hayward, Calif., 94544.

MISSILE NAMED MAC, A. Color, 8 min. Animation shows how ballistic missiles are controlled in the early stages of flight by "command guidance" consisting of a ground computer and radar tracking devices. Explains how such a guidance system has directed many satellites. Free loan for showing only in Arkansas, Kansas, Oklahoma and Texas. Order only from Dallas center. See address above. (S–A)

PIONEERS OF SPACE. B/W, 27½ min. On-the-spot coverage of the orbital flights of Astronauts John Glenn and Scott Carpenter. An NBC News Special. Free loan. (U–S–A)

PATH TO SPACE, THE. B/W, 28 min. A film record of Astronaut Alan Shepard's historic flight into space. Free loan. (U–S–A)

Bell Telephone Co. Apply to your local Bell Telephone Company business office.

BIG BOUNCE, THE. Color, 14 min. A documentary about Project Echo which proved that man-made satellites can be used for intercontinental communications. Describes possible future television and telephone satellite systems. Free loan. (U–S–A)

TELSTAR. Color, 27 min. The history and development of Project Telstar's successful transmission of signals. Free loan. (U–S–A)

VOICE FOR MERCURY, A. Color, 14½ min. A look at the tense activity at ground communications and tracking stations during a Mercury space flight. A launching and the lightning speed at which computers calculate orbital data are part of these behind-the-scenes shots of the nation's space program. Filmed in cooperation with the National Aeronautics and Space Administration. Free loan. (U–S–A)

Carousel Films Inc., 1501 Broadway, New York, N.Y., 10036

WAVES OF THE FUTURE. B/W, 26 min. A demonstration of a space communications technique whereby a human voice is beamed to the moon and its reflection is bounced back to earth. Also shows how radio waves and radar have been used to pinpoint the distance between Earth and Venus. $135. (S–A)

109 DAYS TO VENUS. B/W, 32 min. A documentary film covering the Mariner II space probe which raced past the planet Venus and sent back to earth valuable information for future space missions. $150. (S–A)

MYSTERY OF THE SUN. B/W, 26 min. New ways of using rockets to obtain facts about the sun are discussed by leading scientists. $135. (S–A)

Coronet Instructional Films, 65 E. South Water St., Chicago, Ill., 60601

VELOCITY AND ACCELERATION. 13½ min. Defines motion and explains concepts of velocity and acceleration. Illustrates both positive and negative acceleration and shows how the concepts of velocity and acceleration are used in describing precisely the action of all bodies in motion. Color, $150; B/W, $75. (S)

SPACE SCIENCE: THE PLANETS. 16 min. A survey of the nine planets and their satellites. Provides information about their temperatures, atmospheres, periods of rotation and revolution, distances from the sun. Also shows instruments launched into space to gather information about the planets. Color, $180; B/W $90. (I–U–S)

GRAVITY. 11 min. Explains principles of the force of gravity. Demonstrates attraction in relation to mass and distance and the effect of gravity on the solar system. Discusses "mutual attraction between all bodies". Color, $120; B/W, $60. (U)

CENTRIPETAL FORCE AND SATELLITE ORBITS. 11 min. Experiments show how mass, velocity, and radius affect the magnitude of centripetal force. A statement of the relationship between these factors leads to an equation which may be used in solving such problems as the velocity needed to hold a satellite in orbit. Color, $120; B/W, $60. (U)

SPACE SCIENCE: AN INTRODUCTION. 13½ min. Through the action of models and animated effects, viewers are shown how launching speed and direction affect spacecraft orbits. Demonstrates space science terms such as g-forces, thrust, and acceleration. Color, $150; B/W, $75. (I–U)

Walt Disney 16mm Films, 350 S. Buena Vista St., Burbank, Calif., 91503

MAN IN SPACE. Color, 33 min. Takes a man on a rocket trip into outer space. Discusses weightlessness and ways of meeting new problems of food, clothes and living conditions. Traces the development of rockets from ancient Chinese weapons to the 4-stage rocket for interplanetary travel. Sale price, $300; rental, $12. (S–A)

MAN AND THE MOON. Color, 20 min. A simulated trip to the moon. Although NASA's Project Apollo is somewhat different from this imaginary voyage, there are some similarities to be found in this film that was produced before Project Apollo and its equipment was decided upon. Sale price $220; rental, $10. (U–S–A)

MARS AND BEYOND. Color, 30 min. Discusses conditions on Mars and possibility of life on that planet. Describes an imaginary flight to Mars taking off from a space station. Sale price, $300; rental, $12. (U–S–A)

ALL ABOUT WEIGHTLESSNESS. Color, 11 min. An excerpt from MAN IN SPACE that demonstrates through animation the strange conditions under which the astronaut must live, eat and sleep in the "weightless" environment of space. Sale price, $120. (U–S–A)

Encyclopaedia Britannica Films, 1150 Wilmette Ave., Wilmette, Ill., 60091

EARTH SATELLITES: EXPLORERS OF OUTER SPACE. 17 min. The launching of the Explorer and Vanguard satellites with explanations as to why satellites remain in orbit and the uses of satellites. Color, #1686, $180; B/W, #1687, $90. (I–U)

FIRST MEN INTO SPACE. 16 min. Illustrates problems of man's survival in space and shows how these problems were overcome on the first American orbital flights. Color, #1938, $180; B/W, #1939, $90. (I–U–S)

A TRIP TO THE MOON. 17 min. An imaginary trip around the moon to observe its surface features. Explains origin of craters and seas and illustrates devices for measuring lunar temperatures and the effects of gravity. Color, #1572, $180; B/W #1573, $90. (I–U)

A TRIP TO THE PLANETS. 15 min. An imaginary trip to the planets to show structure of the solar system, motion of the planets and controlling forces. Also explains appearance and possible surface conditions. Color, #1995, $180; B/W, #1996, $90. (I–U)

ROCKETS: HOW THEY WORK. 16 min. Shows a launching including countdown procedure and lift-off. Compares rocket propulsion with other types of motive power and explains principles. Discusses rocket fuels, multi-stage rockets and guidance systems. Color, #1684, $180; B/W, #1685, $90. (I–U–S–A)

GRAVITY: HOW IT AFFECTS US. 14 min. Demonstrates the force of gravity and shows how it affects objects on earth and in space—particularly human beings in space. Color, #1786, $150; B/W, #1787, $75. (I–U)

MOON, THE. #148. B/W, 11 min. Major concepts about the moon with emphasis on its motion. Principle facts about lunar and solar eclipses. $60. (U)

JUPITER, SATURN AND MARS IN MOTION. #1843. Color, 8 min. silent. Time-lapse photographs taken through the 60-inch Mt. Wilson Observatory telescope illustrating characteristics of these planets. Mars polar cap and a planetwide dust storm are seen among other items. $90. (U)

FRONTIERS IN SPACE. 11 min. Explains the use of optical and radio telescopes and astronomers' methods for analyzing data about the stars. Includes pictures of the Hale telescope at the Palomar Observatory. Color, #2022, $120; B/W, #2023, $60. (I–U)

Film Associates of California, 11014 Santa Monica Blvd., Los Angeles, Calif., 90025

GRAVITY, WEIGHT, AND WEIGHTLESSNESS. 11 min. Explores the relationship between gravity and weight. Illustrates the effects of gravity on a spacecraft orbiting the earth and how weightlessness can be duplicated briefly during certain aircraft maneuvers. Color, $120; B/W, $60. (U)

HOW WE EXPLORE SPACE. Color, 16½ min. Discusses astronomical instruments and how they are used. Shows how astronomers have discovered facts about the universe. $175. (U–S)

COMMUNICATION SATELLITES. 12½ min. Explains special role of satellites in long-distance communications. Shows how a communications satellite system works using Telstar and Syncom as examples. Color, $130; B/W, $70. (U)

ROCKETS: PRINCIPLES AND SAFETY. 11 min. Principles of rocket propulsion and why rockets can operate in space. Stresses dangers of amateur rocketry and need for many precautions. Color, $120; B/W, $60. (U)

SATELLITES: STEPPING STONES TO SPACE. 17½ min. What satellites are and their importance. How instruments within a satellite gather information in space. Shows launching of Explorer 1 and discusses how satellites stay in orbit and how they are tracked. Color, $180; B/W, $95. (U–S)

BALANCE OF LIFE AND THE SPACE AGE. 13½ min. Shows the basic necessities for sustaining life and how a "closed ecological system" within a spacecraft could provide these necessities. Color, $150; B/W, $75. (U–S)

HOW WE KNOW THE EARTH'S SHAPE. 11 min. Includes footage showing how earth satellites have gathered data on the shape of the earth. Color, $120; B/W, $60. (U–S)

SOUND WAVES AND STARS: THE DOPPLER EFFECT. Color, 12 min. How certain characteristics of sound and light are used to discover facts about stars and the nature of the universe. $125. (U–S)

HOW WE KNOW THE EARTH MOVES. 11 min. Viewers participate in an experiment that illustrates star shift—the method astronomers use to determine the earth's solar orbit. Color, $120; B/W, $60. (U–S)

International Business Machines Corporation, c/o Director of Information, Federal Systems Division, 326 East Montgomery Ave., Rockville, Md.

EYES IN SPACE. Color, 9 min. Tells the story, through animation, of the Orbiting Astronomical Observatory—a telescope in space—whose mission is to unveil the mysteries of the universe through ultraviolet mapping of the stars. Free loan. (U–S–A)

X–15—MAN INTO SPACE. Color, 8 min. Efforts of the U.S. Air Force, NASA and North American Aviation to fly man to the edge of outer space. Shows role of computers, also. Free loan. (S–A)

International Film Bureau, 332 South Michigan Ave., Chicago, Ill., 60604

PLANETS, THE. Color, 11 min. Movements of planets around the sun are shown by an orrery, and the comparative sizes of planets, their distances from the sun, revolutions and satellite systems are discussed. Sale price, $110; rental, $5. (I)

REACHING INTO SPACE. Color, 14 min. An introduction to space exploration. Explains rocket power, thrust and escape velocity. Includes pictures of astronauts undergoing space flight training, and pictures of the earth taken from rockets. Sale price, $150; rental, $6. (I)

International Screen Organization, 1445 18th Ave. North, St. Petersburg, Fla., 33704

MOON, THE. B/W, 11 min. Closeup telescope pictures of the moon including numerous features and areas that have been under investigation by Ranger spacecraft. $55. (S–A)

McGraw-Hill TEXT-FILMS, 330 West 42d St., New York, N.Y., 10036

APOLLO—JOURNEY TO THE MOON. 30 min. Investigates NASA's preparations for a manned mission to the moon. Includes rocket engine tests, the Lunar Excursion Module, and the launching site at Cape Kennedy. B/W, approx. $150; color, approx. $300. (U–S)

COSMIC RAYS. 27 min. Present concepts of the origin and nature of charged particles reaching earth from outer space. Illustrates research methods using balloons, rockets and satellites, and explains the relationship between cosmic ray research and nuclear research. B/W, $90; color, $165. (S–A)

FLAMING SKY, THE. 27 min. Theories of the nature of the aurora and how it relates to earth's upper atmosphere and the sun. Shows scientists measuring the aurora and conducting experiments concerning auroral theory. B/W, $90; color, $165. (S–A)

FORCE OF GRAVITY, THE. 27 min. Explains the nature of gravity and the role of gravity in the motion of the planets. Examines Newton's and Einstein's theories of gravity and discusses gravitational problems relating to space travel. B/, $90; color, $165. (S–A)

MAGNETIC FORCE. 27 min. Explains the earth's magnetic field and that existing in space. Shows how the mangetic field affects cosmic rays and what it has contributed to man's understanding of the nature of the universe. B/W, $90; color, $165. (S–A)

SCIENCE IN SPACE. 27 min. How satellites are placed in orbit, and how they are tracked by radio and optical methods. Also explains telemetry, and stresses the importance of satellites and space probes in adding to man's knowledge of the cosmos. B/W, $90; color, $165. (S–A)

RESEARCH BY ROCKET. 27 min. How the upper atmosphere is studied through instruments carried aloft by rockets. Examines briefly some of the important discoveries made by instrumented rockets regarding the ionosphere, cosmic rays, the aurora and the earth's magnetic field. B/W, $90; color, $165. (S–A)

RADIO WAVES. 27 min. Discusses natural and man-made radio waves. Explains the relationship of the ionosphere, radio waves, the earth's magnetic field and solar activity. Examines the science of radio astronomy. B/W, $90; color, $165. (S–A)

HISTORY AND DEVELOPMENT OF ROCKETS, THE. 16 min. Traces the development of rockets from ancient times to the present, and examines 19th century experiments in space travel. Also illustrates the scientific principles of modern rocketry and the rapid growth of space flight. B/W, $95; color, $190. (S–A)

MIRROR IN THE SKY. 21 min., B/W. How the findings of Hertz, Marconi, Preece, Fleming and Appleton have contributed to modern advances in radio, radar, electronic navigation and radio astronomy. $110. (S–A).

LIFE ON OTHER PLANETS. 28 min. An examination of theories regarding the possibility of life on other planets—what forms life might take and the necessary conditions to support various forms of life. B/W, $150; color, $300. (S–A)

NEAREST STAR, THE. 27 min. The properties of the sun and the relationship between solar activity and the earth's atmosphere are explained. The launching of a "sun seeker" telescope by means of a high altitude balloon and scientists at work in an airborne geophysical laboratory are shown. B/W, $90; color, $165. (S–A)

SKY AND THE TELESCOPE, THE. 15 min. Distinguishes between the real and apparent motions of the stars, demonstrates how the earth's rotation affects telescopic observations and offers ideas on techniques for amateur observers. B/W, $90; color, $180. (U–S)

UNIVERSE, B/W, 26 min. Animation and special effects provide a journey into the far regions of the sky. The voyage moves past the planets and the nearest suns to the galaxies with astronomers as guides. $145. (S–A)

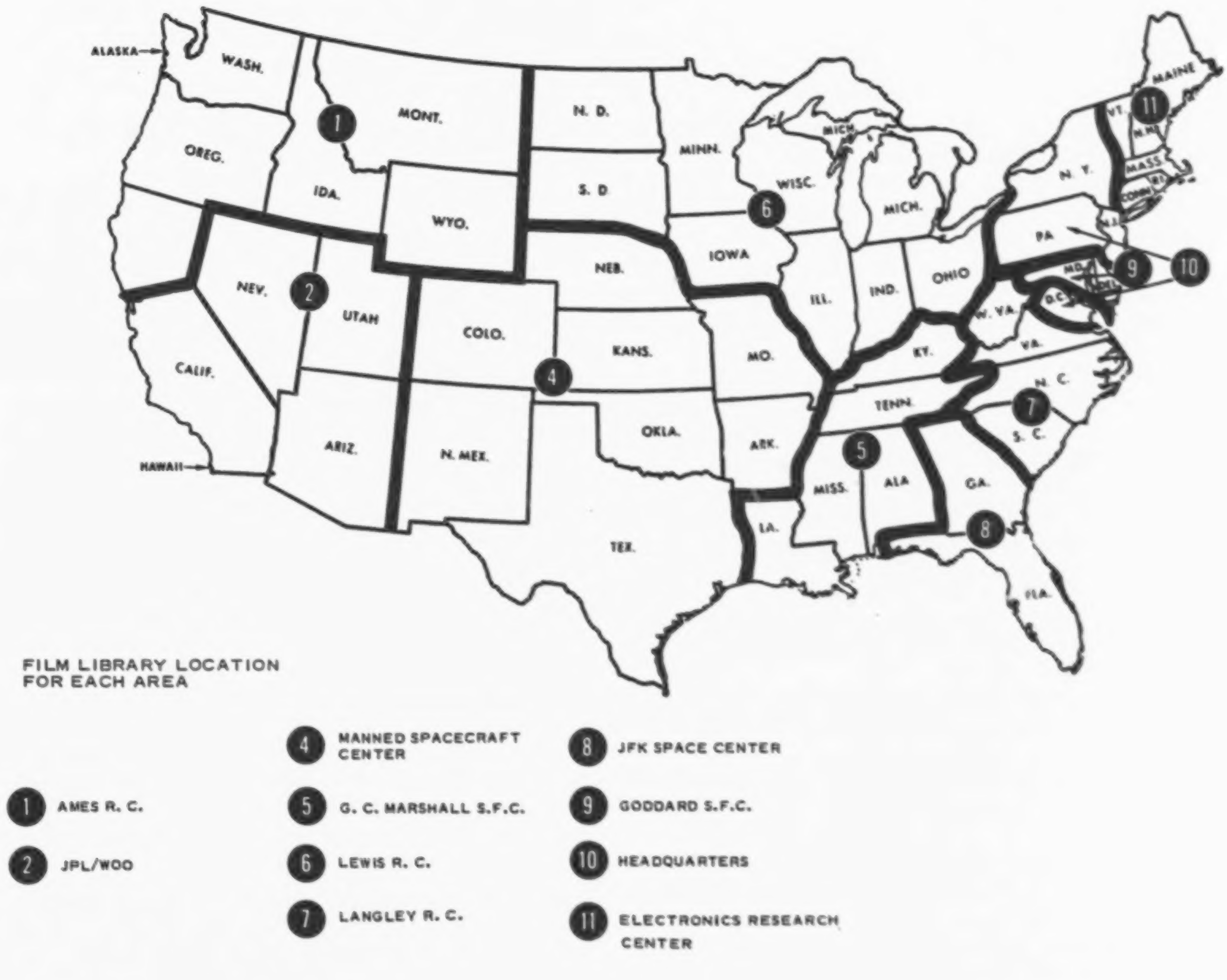
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION FILMS

Requests for the free loan of NASA films should be addressed to the library assigned responsibility for your area, as indicated by the area map on page 53.

If You Live in—	*Service Area*	*Address Your Request to—*
Washington, Oregon, Idaho, Montana, Wyoming, northern California. (north of the Los Angeles metropolitan area), Alaska.	#1	NASA AMES RESEARCH CENTER Public Affairs Office Moffett Field, Calif. 94035
Arizona, southern California. (San Luis Obispo, Kings, Tulare, and Inyo Counties), Hawaii.	#2	NASA WESTERN OPERATIONS OFFICE Public Affairs Office 150 Pico Boulevard Santa Monica, Calif. 90406 Also NASA JET PROPULSION LABORATORY Photographic Services 4800 Oak Grove Drive Pasadena, Calif. 91103
Arkansas, Missouri, Texas, Oklahoma, Kansas, Nebraska, New Mexico, Colorado.	#4	NASA MANNED SPACECRAFT CENTER Public Affairs Office, AP2 2101 Webster Seabrook Road Houston, Tex. 77058
Alabama, Mississippi, Tennessee, Louisiana, Kentucky	#5	NASA MARSHALL SPACE FLIGHT CENTER Public Affairs Office Community Services Huntsville, Ala. 35812
Ohio, Indiana, Illinois, Wisconsin, Michigan, North Dakota, South Dakota, Minnesota, Iowa.	#6	NASA LEWIS RESEARCH CENTER Office of Educational Services (4–4) 21000 Brookpark Road Cleveland, Ohio 44135
Southern Virginia (Richmond-South), West Virginia, North Carolina, South Carolina.	#7	NASA LANGLEY RESEARCH CENTER Public Affairs Office Mail Stop 154 Langley Station Hampton, Va. 23365 Photographic Operations Section
Florida, Bermuda, Georgia	#8	NASA JOHN F. KENNEDY SPACE CENTER Code SOP 323 Kennedy Space Center, Florida 32809
Maryland, Delaware	#9	NASA GODDARD SPACE FLIGHT CENTER Photographic Branch, Code 253 Greenbelt, Md. 20771
Northern Virginia (north of Richmond), District of Columbia, Pennsylvania, New Jersey, New York, Canada, Latin Americas and overseas.	#10	NASA HEADQUARTERS Code FAD–2 Washington, D.C. 20546

If You Live in—	*Service Area*	*Address Your Request to—*
Maine, Vermont, New Hampshire, Connecticut, Massachusetts, Rhode Island.	#11	NASA ELECTRONICS RESEARCH CENTER Educational Programs Office 575 Technology Square Cambridge, Mass. 02139

NASA MOTION PICTURE FILM SERVICE AREAS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6 LEWIS R. C.
7 LANGLEY R. C.
8 JFK SPACE CENTER
9 GODDARD S.F.C.
10 HEADQUARTERS
11 ELECTRONICS RESEARCH CENTER

WHO MAY BORROW

Residents of the United States and Canada, who are bona fide representatives of educational, civic, industrial, professional, youth activity, and government organizations are invited to borrow films from the NASA Film Library which services their area. There is no film rental charge, but the requestor must pay return postage and insurance costs. In view of the wear and tear that results from repeated projection, films are loaned for group showings and are not for screening before individuals or in homes. Because custody of the films involve both legal and financial responsibility, films cannot be loaned to minors.

To expedite shipment of film, requestor should give name and address of person and organization, specifying showing date and alternate date. Also, it is advisable to indicate a substitute film.

Films are cleared for use by TV stations unless otherwise noted for unsponsored public service or sustaining telecasts.

NASA GENERAL INTEREST FILMS

A VOICE FOR MERCURY. #HQa 66. Color, 14½ min. Describes the construction and equipment of the worldwide Mercury tracking network. Free loan. (S–A)

ALOUETTE-CANADA'S FIRST SATELLITE. #HQa 94. B/W, 14 min. Shows the design and operation of a satellite whose mission is to investigate the ionosphere. (Cleared for ETV use only.) Free loan. (S–A)

AMERICA IN SPACE. #HQ 103. Color, 14 min. Brief overview of NASA's first five years showing the growth of America's space program from Explorer I through early phases of Project Apollo and manned exploration of the moon. Free loan. (S–A)

ARIEL—THE FIRST INTERNATIONAL SATELLITE. #HQ 58. Color, 13 min. Describes the sun's effects on earth's ionosphere and how this in turn affects radio transmission. The importance of international cooperation in space investigation is stressed when this British-built satellite was launched and tracked by the United States. Free loan. (S–A)

ARIEL II. #HQa 115. Color, 26½ min. The second international satellite and how it was developed and placed into orbit to gain new knowledge about the structure of the universe. Shows research and development, assembly, testing, evaluation and launching. Free loan. (S–A)

ASTRONAUT SHEPARD REPORTS ON SPACE. #HQ 48. Color, 20 min. Shows Astronaut Shepard receiving the NASA Distinguished Service Medal from President Kennedy, May 8, 1961, and Shepard's press conference later that day, illustrated by film of his flight. Free loan. (S–A)

BEATING THE HEAT. #HQ 1. Color, 18½ min. Depicts some of the NASA facilities for studying problems of aerodynamic heating and deceleration. Free loan. (S–A)

BEFORE SATURN. #HQa 76. Color, 14½ min. The history of rockets from early Chinese use up to and including the giant Saturn launch booster. Free loan. (S–A)

THE BIOSATELLITE PROGRAM—BETWEEN THE ATOM AND THE STAR. #HQ 107. Color, 28 min. Depicts the need for biological experiments in a zero gravity environment; how the biosatellite makes its occupants weightless; types of experiments planned; and how the experiments will contribute to knowledge of basic life processes and toward man's living in space. Free loan. (S–A)

CELESTIAL MECHANICS AND THE LUNAR PROBE. #HQa 26. Color, 9½ min. Describes mechanics of guiding lunar probes. Free loan. (S–A)

THE CLOUDS OF VENUS. #HQa 82. Color, 30 min. The planning, launching and results of the Mariner II voyage past Venus. Free loan. (S–A)

ECHO IN SPACE. #HQ 37. Color, 14 min. Tells the story of Thor-Delta II which placed Echo I, a 100-foot diameter sphere in orbit as a passive communications satellite in 1960. (A short version of *Project Echo* #HQ 24). Free loan. (S–A)

ELECTRIC PROPULSION. #HQ 96. Color, 24 min. Shows in nontechnical terms, what electric propulsion is, how it works, why it is needed, its present status and program for development, and how it may be used for both manned and unmanned missions. Free loan. (S–A)

FATHER OF THE SPACE AGE. #HQa 54. B/W., 18½ min. Traces the development of Dr. Robert Goddard's "moon rocket" research from his early manhood through his final efforts in development of liquid fueled guided rockets. Includes commentaries by Mrs. Goddard, original motion picture coverage of Dr. Goddard's rocket tests, scenes of the dedication of Goddard Space Flight Center, and the posthumous presentation of the Langley Medal award in 1959. (Cleared for ETV use only.) Free loan. (S–A)

THE FLIGHT OF FAITH 7. #HQa 101. Color 28½ min. Astronaut Gordon Cooper's flight on Aug. 15–16, 1963 is documented from preflight training and medical checkouts to launch, flight, and recovery. Special motion picture scenes made from color still photos taken of the earth by Astronaut Cooper are included. Free loan. (S–A)

THE FOUR DAYS OF GEMINI 4. #HQa 134. Color, 27½ min. Covers the Gemini-Titan 4 mission of Astronauts James McDivitt and Edward White. Includes prelaunch and launch activities, Astronaut White's spectacular "space walk" and many other experiments conducted during the mission including photographs of the earth. Sound track uses narration and actual voice communications of the Astronauts inside the spacecraft. Shows details of White's space suit and "space gun". Free loan. (U–S–A)

FREEDOM 7. #HQa 51. Color, 28½ min. Pictures Astronaut Shepard's suborbital launch. Describes part of his training, his activities during the last few days before the launch, his recovery and reception aboard the rescuing aircraft carrier. Free loan. (S–A)

FRIENDSHIP 7. #HQa 59. Color, 58 min. Depicts the day Astronaut John Glenn orbited the earth three times. Documents Project Mercury including a close look at tracking stations around the world. Free loan. (S–A)

THE HARD ONES. #HQ 120. Color, 15 min. Describes the difficulties and problems encountered in designing, building, and operating unmanned satellites for scientific research and practical applications such as communications and weather forecasting. Features the Orbiting Geophysical Observatory designed to gather knowledge about the earth, sun, and their inter-relationships. Free loan. (S–A)

THE HIGHEST HONOR. #HQ 81. Color, 17½ min. Documents the presentation of the President's Award for Distinguished Federal Civilian Service and gives a brief insight into the careers of six award recipients. Included in the list of recipients is Dr. Robert R. Gilruth of NASA Manned Spacecraft Center, Houston, Tex. Free loan. (S–A)

JOHN GLENN SPEAKS TO YOUNG AMERICANS. #HQ 80. Color, 11½ min. Astronaut Glenn addresses science fair winners and answers their questions about space exploration. His message is a challenge to young people to prepare for important responsibilities in the space age. Free loan. (U–S)

THE JOHN GLENN STORY. #HQa 90. Color, 30 min. A biography of Astronaut John Glenn narrated by Jack Webb. Stresses American ideals as exemplified in the life of Astronaut Glenn; the importance of physical, mental, and moral values. Follows his youthful days in New Concord, Ohio; his heroism as a combat pilot in World War II and the Korean War, and his momentous adventure as the first American to orbit the earth. Free loan. (U–S–A)

LUNAR BRIDGEHEAD. #HQa 117. B/W 29 min. Spot coverage of events surrounding the launch and successful flight of the Ranger VII spacecraft that transmitted to earth more than 4,000 photographs as it approached the surface of the moon. Moon pictures are included. Free loan. (S–A)

MANNED SPACE FLIGHT 1964. #HQ 114. Color, 14 min. A movie report of NASA's manned flight programs —the Gemini two-man earth-orbital flights and the three-man Apollo lunar landing missions. Free loan. (S–A)

THE MASTERY OF SPACE. #HQ 9. Color 58 min. Traces the development of Project Mercury and documents the flight of Freedom 7 as well as the orbital flight of Friendship 7 on Feb. 20, 1962. Projects Gemini, Apollo and the Saturn booster are also briefly discussed. Free loan. (S–A)

MISSILES ROCKETS AND SATELLITES. #HQa 14. B/W, kinescope, 29½ min. A discussion of the flight of Pioneer III and the history and future of rocket power. (Not cleared for TV use.) Free loan. (S–A)

ORBITING SOLAR OBSERVATORY. #HQa 95. Color, 26 min. Describes the functioning of the orbiting solar observatory in gathering data about the sun's effects on the earth and its inhabitants. Free loan. (S–A)

PROJECT APOLLO—MANNED FLIGHT TO THE MOON. #HQ 88. Color, 13 min. Major steps in the project to place men on the moon and get them back to earth safely. Shows principal features of the Gemini spacecraft, the Titan booster and the kinds of operations to be carried out under the Gemini program. Covers the complete sequence of events for the manned lunar landing from earth launch to return. Free loan. (S–A)

PROJECT ECHO. #HQ 24. Color, 27 min. Tells the story of Thor-Delta I and Thor-Delta II. Thor-Delta II placed Echo I, a 100-foot sphere in orbit as a passive communications satellite in August, 1960. Free loan. (S–A)

RANGER VII PHOTOGRAPHS OF THE MOON. #HQa 118. B/W, 7 min. TV photographs of the moon, taken by the "A" camera of Ranger VII as it approached the moon on July 31, 1964, are described. Free loan. (S–A)

SATURN—GIANT STEP TO THE MOON. #HQ 55. Color, 15 min. Film follows the Saturn SA–1 booster on its trip by barge to Cape Kennedy. Shows its erection and launch. The launch of SA–2 and project "High Water" are included. Free loan. (S–A)

SATURN LAUNCH COMPLEX 34. #HQa 79. Color, 16½ min. Dr. Kurt Debus, Director, NASA Launch Operations Center, discusses with the help of models and diagrams the complexities of the building and operation of Saturn Complex 34 compared with smaller rocket launch complexes such as Juno II, Jupiter C, and Redstone. Dr. Debus tells why a newer and larger complex than #34 will be needed to launch the Saturn vehicles which will carry man to the moon. Free loan. (S–A)

SATURN PROPULSION SYSTEMS. #HQa 77. Color, 14 min. The theory of reaction engines and the application of the theory in the Saturn propulsion system. Free loan. (S–A)

THE SHAPE OF THINGS TO COME. #HQ 106. Color, 21 min. Describes the need for advanced research and provides examples of promising research programs. Free loan. (A)

SPACE FOR THE BENEFIT OF MANKIND. #HQk 93. B/W, 55 min. (Kinescope.) A survey of major NASA space science programs including Projects Mercury, Gemini, and Apollo, communications and meteorological satellites, and plans for deep space travel. Included is a television tour of the NASA space science exhibition for high school students. Free loan. (S–A)

SPACEMOBILE. #HQk 98. Color, 45½ min. (Kinescope). A Spacemobile lecturer discusses the history of rocketry from ancient times through the huge rocket for Project Apollo. Many fundamental scientific principles are explained by simple demonstrations and in easily understood language. Free loan. (U–S–A)

STEPS TO SATURN. #HQa 67. Color, 22 min. Depicts the background and development processes of the Saturn program. The historic change from rocket weapon to rocket space vehicle is noted, with the NASA role documented. Film culminates with the flight of the first vehicle. The conflict between man and space is dramatically posed. Free loan. (S–A)

TIME AND SPACE. #HQa 27. Color, 27 min. Describes the construction and launching of Juno II, Pioneer IV space probe. Free loan. (S–A)

TIROS, EXPERIMENTAL WEATHER SATELLITE. #HQa 25. Color, 14 min. Depicts the preparation and launch of the rocket vehicle and payload of Tiros I, April 1, 1960. The payload and its functions are described, as are future meteorological satellites. Free loan. (S–A)

TIROS II, EXPERIMENTAL WEATHER SATELLITE. #HQa 31. Color, 6 min. Shows launch of Tiros II, November 23, 1960, and summarizes results of the three months of activity during which Tiros I transmitted TV pictures of the earth's cloud cover. Describes the TV cameras used, and subsystems used to measure earth and atmospheric radiation. Free loan. (A)

TRIAL BALANCE. #HQ 123. Color, 27 min. Presents current knowledge in space science, particularly that gained through analyses of information acquired from spacecraft. Free loan. (S–A)

UNIVERSE. #HQa 91. B/W, 28 min. Explores by animation and special effects the solar system, Moon, Mars, Venus, Mercury, Earth, Saturn and on into the galaxies beyond the Milky Way. (Cleared for ETV use only.) Free loan. (U–S–A)

UNMANNED SPACECRAFT. #HQ 38. Color, 14½ min. Dr. Hugh L. Dryden introduces the subject of the aims of the U.S. space program. The successful launches of the scientific programs of 1959 and 1960 are shown. Dr. Homer E. Newell shows models of spacecraft such as Ranger, Mariner, and Surveyor. Free loan. (S–A)

X–15 DOCUMENTARY. #HQa 28. Color, 26½ min. Documents the research, development and flight testing of the X–15 rocket airplane—a joint effort of the U.S. Air Force, NASA, and the U.S. Navy. Free loan. (S–A)

A MOMENT IN HISTORY. #HQa 122. Color, 13½ min. Film shows the events leading to the presentation of honorary U.S. citizenship to Winston Churchill by President Kennedy on April 9, 1963. The live television transmission was sent via Relay satellite from the White House to England. Free loan. (U–S–A)

THE WORLD BEYOND ZERO. #HQa 121. Color, 28 min. The story of a satellite and the cooperative efforts of the world-wide network tracking stations linking the space scientists and engineers with their orbiting spacecraft. Film views Cape Kennedy; Lima, Peru; Santiago, Chile; Johannesburg, South Africa; Anchorage, Alaska; Winkfield, England; and Woomera, Australia. The film stresses cooperation between nations engaged in the exploration of space. Free loan. (U–S–A)

YOUR SHARE IN SPACE. #HQ 56. Color, 27 min. Discusses U.S. efforts in space research in many areas: booster evolution, payload development and instrumentation, final launch and data acquisition processes. The X–15 rocket plane is shown during launch and flight testing. Free loan. (S–A)

NASA TECHNICAL FILMS

AERODYNAMIC HEATING AND DECELERATION DURING ENTRY INTO THE PLANETARY ATMOSPHERES. #HQ 5. B/W, 20 min. Discusses the problems of heating during entry into the atmospheres of other planets in our solar system. Free loan. (S–A)

CHEMISTRY OF METEOR VAPORIZATION. #HQ 6. Color, 27½ min. The effects of objects entering earth's atmosphere. Explains the vaporization of solid matter from the object, by the friction encountered as the object enters the earth's dense atmosphere and is slowed rapidly in speed. Free loan. (S–A)

EXOBIOLOGICAL SAFETY. #HQa 65. Color, 12½ min. Describes Army Chemical Corps research on sterilization of unmanned and manned space vehicles designed to land on other planets in our and other solar systems. Possible methods for germ free exploration of other planets and return to earth are shown through animation and laboratory experiments. Free loan. (S–A)

HIGH TEMPERATURE MATERIALS. #HQ 4. Color, 20½ min. Tests of various materials at elevated temperatures to determine their suitability for high temperature applications are described. Free loan. (A)

PERFORMANCE OF LONG RANGE HYPERVELOCITY VEHICLES. #HQ 2. B/W, 30 min. Explains the design of simple, efficient rocket engine vehicles for use at high speeds and long ranges. Discusses ballistic trajectory, skip glide trajectory, and glide trajectory as being most suitable for use with hypervelocity vehicles. Free loan. (A)

NASA SPACE BIOLOGY FILMS

THE CHEMISTRY OF LIFE. #HQ 33. Color, 13½ min. Dr. Melvin Calvin of the University of California describes the chemical building blocks of life and discusses his experiments with meteorites as a possible environment for the production of life. Free loan. (S–A)

DECONTAMINATION OF SPACE VEHICLES. #HQ 35. Color, 17 min. Dr. Charles Phillips and Robert K. Hoffman discuss the biological problems and the need for the decontamination of space vehicles. They show different methods of achieving this decontamination. Free loan. (S–A)

HOW DID LIFE BEGIN? #HQ 32. Color, 19½ min. Dr. Sidney Fox of Florida State University discusses the evolutionary relationships of various protein molecules. He traces his synthesis of artificial protein. Free loan. (S–A)

LIFE ON OTHER PLANETS. #HQ 34. Color, 20 min. Dr. Joshua Lederberg of Stanford University discusses the possibility of life existing on other planets. He tells of the various ways that life could have been introduced and describes the methods of detecting and investigating these theories. Free loan. (S–A)

NASA TECHNOLOGY UTILIZATION FILMS

EXTERNAL MIXING SPRAY GUN NOZZLE. #HQa 111. Color, 4½ min. Demonstrates the useful properties of a paint mixing device for spray guns, the patent for which is the property of a NASA employee. Colors do not have to be premixed and they can be regulated by a simple hand adjustment. Free loan. (A)

HAZARDS OF TIRE HYDROPLANING TO AIRCRAFT OPERATION. #HQ 112. Color, 15 min. Explains the phenomena of tire hydroplaning, under what conditions it occurs, and the resulting hazards to aircraft. Identifies and draws attention to a wet runway hazard which is not yet fully appreciated. Film may be used as a training film for flight and flight safety personnel. Free loan. (A)

OPTICAL COMMUNICATIONS DEVICE (Retrometer). #HQa 113. Color, 5½ min. Explains an optical communications device based upon the unique properties of corner reflector. One of the reflector sides is replaced with mylar film which can modulate a light beam emitted by a power source. This optical communications system is not based on electromagnetic principles; therefore, it cannot be detected by normal listening procedures. Free loan. (A)

National Education Television Film Service Audio Visual Center, Indiana University, Bloomington, Ind., 47405.

SMALL PLANETS, THE. B/W, 29 min. Discusses appearance, position, motion and physical properties of Mercury, Venus, Mars, Pluto, and the Earth. Rental, $5.40; sale price, $125. (S–A)

GIANT PLANETS, THE. B/W, 29 min. Explores Saturn, Jupiter, Neptune and Uranus. Rental, $5.40; sale price, $1.25. (S–A)

EARTH IN SPACE, THE. B/W, 29 min. Considers the Earth as an object in space and shows its position relative to other planets, its structure, and motion. Rental, $5.40; sale price, $125. (S–A)

MOON, THE. B/W, 29 min. An examination of the moon's surface, motions, phasing and appearance. Rental, $5.40; sale price, $125. (S–A)

JET AND ROCKET ENGINES. 10 min. Principles of reaction applied to both jet and rocket engines. While a portion of this film is related to the operation of jet engines, it also includes demonstrations of rocket engines and a rocket engine firing. Sale prices: color, $200, B/W, $50. Rental (color only) $5.40. (U–S)

HOW TIME AND DISTANCE ARE MEASURED. B/W, 29 min. How the motions of the earth and moon are used to measure time. Considers various methods of estimating distances. Rental, $5.40; sale price, $125. (S–A)

KIWI REACTOR TEST. B/W, 15 min. Shows destruction by scientists of a multimillion dollar reactor to find answers to two questions: What happens when a reactor erupts? and Can nuclear power be harnessed as a power source for a rocket? Includes interviews with scientists. Rental, $2.90; sale price, $85. (S–A)

PROBE OF THE IONOSPHERE. B/W, 8 min. Use of the radio telescope to probe the ionosphere and by picking up electromagnetic radiations, to gather data on the possible existence of intelligent life elsewhere in our galaxy. Rental, $2; sale price, $50. (S–A)

"MULTIVATOR" UNMANNED CRAFT. B/W, 15 min. Discusses a design for one device that might be used in a space probe to determine life conditions on Mars. Includes 12 built-in experiments. Rental, $2.90; sale price, $85. (S–A)

CURRENT KNOWLEDGE OF MARS. B/W, 15 min. Assesses current knowledge of Mars and explains how the Mariner spacecraft's cameras relay closeup photographs indicating the nature of the planet's surface. Rental, $2.90; sale price, $85. (S–A)

ASTRONAUT WATER SURVIVAL. B/W, 10 min. Various techniques of emergency egression from spacecraft in the water. Shows how astronauts learn to maneuver in water in spite of their restrictive Gemini spacesuits. Rental, $2; sale price, $50. (S–A)

RANGER 7 PHOTOGRAPHS. B/W, 15 min. Dr. Gerard Kuiper's assessment of the lunar surface pictures taken by the Ranger 7 spacecraft. Rental, $2.90; sale price, $85. (S–A)

DUMMIES IN EXPERIMENTAL RESEARCH. B/W, 15 min. Deals with manlike instrumented dummies that are substituted for men in dangerous experiments. Shows dummies being produced and used in radiation and ejection seat experimentation—also in air crash simulation. Rental, $2.00; sale price, $65. (S–A)

Neubacher Productions, 1750 Westwood Blvd., Los Angeles 24, Calif.

SPACE SCIENTIST. 11 min. A space scientist demonstrates a space chamber for testing materials and equipment in a vacuum condition simulating space. Also shows the workings of a space suit. B/W, $55; color, $110. (U–S)

Louis de Rochemont Associates Film Library, 267 West 25th St., New York, N.Y., 10001

EXPLORING SPACE. 26 min. History and basic fundamentals of rocketry. The step-by-step development and operation of a modern rocket is demonstrated. Sale price, color, $275; B/W, $100. Rental, color, $15; B/W, $10. (S–A)

Rocket Research Institute, 3262 Castera Ave., Glendale 8, Calif.

THE LONGEST JOURNEY. Color, 10 min. Amateur rocketry with emphasis on safe practices. Explains the safety education program of the Rocket Research Institute (supervised youth activities and workshops for teachers). Rental, $1.50. (U–S–A)

Sterling Movies USA, 375 Park Ave., New York, N.Y., 10022

TOMMY LOOKS AT SPACE. #695. Color, 20 min. Describes how space suits are made and how they enable astronauts to survive in space. Gives historical background of high-altitude suits. Free loan. (S)

PATH OF VENUS, THE. #772. Color, 13 min. The contributions of Pioneer IV and V space probes in discovering facts about interplanetary space. Free loan. (S–A)

United States Air Force Film Library Center, 8900 S. Broadway, St. Louis, Mo. 63125

Note: Requests for Air Force films may also be directed to the local Air Force base film library within commuting distance of person requesting films.

UNIVERSE WITHIN, THE. SFP–1213. Color, 13 min. Shows how man's ventures into space depend upon his ability to adapt his body to the rigors of space flight. Free loan. (S–A)

SPACE RENDEZVOUS. TF–5910. Color, 24 min. Describes procedures for orbital rendezvous and docking. Free loan. (S–A)

AIRCRAFT CALLED SEVENTY, THE. SFP–1156. Color, 31 min. Covers the production and first flights of the XB–70 research aircraft. Free loan. (S–A)

DESTINATION, WHERE? SFP–1299. Color, 10 min. Acquaints the audience with the need for precision geodetics as a foundation for space exploration. Free loan. (A)

SONIC BOOM. SFP–1215. Color, 15 min. Explains the phenomenon of sonic boom and shows what is being done to minimize it. Free loan. (S–A)

U.S. Army films. Requests for the free loan of Army films should be addressed to the Commanding General of the appropriate Army area, ATTN: DCSLOG Service Div. Army Area Headquarters and the States they service are listed below:

Second Army, Fort George G. Meade, Md.
Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, New York, Pennsylvania, Maryland, Virginia, Ohio, West Virginia, Kentucky, Delaware.

Third Army, Fort McPherson, Ga.
North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi.

Fourth Army, Fort Sam Houston, Tex.
Arkansas, Texas, Oklahoma, New Mexico, Louisiana.

Fifth Army, 1660 E. Hyde Park Blvd., Chicago, Ill.
Indiana, Illinois, Michigan, Wisconsin, Missouri, Kansas, Iowa, Nebraska, Minnesota, North Dakota, South Dakota, Wyoming, Colorado.

Sixth Army, Presidio of San Francisco, Calif.
Washington, Oregon, Idaho, Montana, Utah, Nevada, Arizona, California.

Headquarters, U.S. Army Pacific, Fort Shafter, Hawaii.
Hawaii.

Headquarters, U.S. Army Alaska, Fort Richardson, Alaska.
Alaska.

Military District of Washington, Washington, D.C., 20315
District of Columbia and Greater Washington Area.

ROCKET INSTRUMENTATION. #FB6–231. B/W, 15 min. Shows methods and instruments used to track and record the speed, distance and flight of rockets, and how the data acquired are used to improve rocket design. Free loan. (S–A)

LAUNCHING THE EXPLORER. #MF21–6665. B/W, 10 min. The story of the historic launching of the first U.S. earth satellite, Explorer I, Jan. 31, 1958. Depicts features, assembly, and testing of each stage, final assembly, fueling, countdown, firing and launching. Free loan. (S–A)

ARMY EXPLORER. #PROJ 6882. Color, 14 min. The development and launching of Explorer. Contributions made by Drs. von Braun, Pickering and Van Allen. Free loan. (S–A)

U.S. NAVY. Order from District Public Information Officer of your Naval District as follows:

First Naval District, 495 Summer St., Boston 10, Mass.
Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.

Third Naval District, 90 Church St., New York 7, N.Y.
Connecticut, northern half of New Jersey, New York.

Fourth Naval District, U.S. Naval Base, Philadelphia 12, Pa.
Delaware, southern half of New Jersey, Ohio, Pennsylvania.

Fifth Naval District, U.S. Naval Base, Norfolk 11, Va.
Kentucky, Maryland, Virginia, West Virginia.

Sixth Naval District, U.S. Naval Base, Charleston, S.C.
Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee.

Eighth Naval District, U.S. Naval Base, New Orleans 12, La.
Arkansas, Louisiana, New Mexico, Oklahoma, Texas.

Ninth Naval District, U.S. Naval Training Center, Great Lakes, Ill.
Colorado, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Wisconsin, Wyoming.

Eleventh Naval District, 937 Harbor Drive, San Diego 30, Calif.
Arizona, southern half of California.

Twelfth Naval District, Federal Office Building, San Francisco 2, Calif.
Northern half of California, Nevada, Utah.

Thirteenth Naval District, U.S. Naval Station, Seattle 99, Wash.
Idaho, Montana, Oregon, Washington.

Fourteenth Naval District, Pearl Harbor, Hawaii.
Hawaii.

Seventeenth Naval District, Kodiak, Alaska.
Alaska.

Potomac River Naval Command, U.S. Naval Weapons Plant (Bldg. 200), Washington 25, D.C.
District of Columbia.

ABC OF G, THE. #MN-8446. Color, 19 min. Shows how linear acceleration produces more G's. Distinguishes between positive and negative G. Shows test equipment used in research to determine how soon subject greys out, blacks out, or reds out. Also describes effects of 2 to 8 G force on the blood of the body. Free loan. (S-A)

CHALLENGE OF OUTER SPACE, #MID-8826B. B/W, 41 min. Dr. Wernher von Braun lectures on officers' conference on guided missiles—how they function, the problems involved in achieving operational effectiveness, and the challenge of outer space. Free loan. (S-A)

HOT ROD. #MC-8851. Color, 29 min. Shows the help given by industry and the Navy in developing and testing a boy's rocket. Free loan. (S)

United World Films, 221 Park Ave., South, New York, N.Y., 10003.

ROCKETS AND SATELLITES. 10½ min. Explanations of principles of space flight are presented: action-reaction, gravity, friction, motion, energy and orbital flight. Achievements of rocketry and its future implications for daily living. B/W, $77; color, $135. (I-U-S)

WAY STATIONS IN SPACE. 10½ min. Basic principles of a space station—construction and operation in orbit of a "spinning wheel" type of manned space platform. B/W, $77; color, $135. (I-U-S)

FILMSTRIPS

The filmstrips listed below are 35 mm., with captions, in black and white, and in color as indicated. Due to their modest purchase price, rental arrangements usually are not offered. Some distributors will ship filmstrips on approval.

Basic Skill Films, 1355 Inverness Drive, Pasadena 3, Calif.

THE EARTH SATELLITE. Color, 50 frames. What it is, how it is launched into space, what its function is and its importance. $6. (U–S)

MAN FACES OUTER SPACE. Color, 44 frames. Hazards of space travel—radiation, reduced air pressure, acceleration, weightlessness, temperature extremes. $6. (U–S)

HOW ROCKETS AND JETS WORK. Color, 43 frames. The principles of rocket and jet engines showing relationships to Newton's Law of Motion. Discussion questions and experiments are included. $6. (U–S)

Headquarters, Ellington Air Force Base, Civil Air Patrol, Tex., 77030

INTRODUCTION TO AEROSPACE. Color, 63 frames. Explains how aviation and space technology are changing human events, and interprets the impact of air and space vehicles on the world. With 33⅓ rpm record and study guide. $6. (S–A)

DAWNING SPACE AGE, THE. Color, 55 frames. Explains rockets, missiles, satellites and space vehicles, and emphasizes current and future space exploration projects. With 33⅓ rpm record and study guide. $6. (S–A)

PROBLEMS OF AEROSPACE POWER, THE. Color, 60 frames. Explains the major challenges generated by aerospace technology, and its effects on our way of life. With 33⅓ rpm record and study guide. $6. (S–A)

Communicative Arts, P.O. Box 11017, San Diego, Calif., 92111

COMMUNICATION BY SATELLITE. Color, 36 frames. Outlines need for growth in overseas communication facilities. Describes how satellites will meet these needs. Presents information on such communication satellites as Echo, Telstar, Relay and Syncom and explains the use of ground stations. Includes record. $8. (I–U)

COMPUTERS, NUMBERS AND PEOPLE. Color, 31 frames. Explains what computers are, how they work, how they use number systems, and the kinds of work they do. Includes record. $8. (S)

FROM DRAWING BOARD TO LAUNCHING PAD. Color, 28 frames. The building, transporting and testing of a missile. Includes record. $8. (U)

MEDICAL ASPECTS OF SPACE FLIGHT. Color, 24 frames. Physical problems of space flight including lack of oxygen, acceleration, radiation, weightlessness and temperature extremes. Includes record. $8. (S)

Curriculum Materials Corporation, 1319 Vine St., Philadelphia, Pa., 19107

GRAVITY, THE BIG PULL. #A–420. Color, 51 frames. Develops concepts of gravity. $6. Accompanying 33⅓ rpm record, $4.95; test filmstrip in color, $4.95. Complete set, $14. (I)

INTO OUTER SPACE. #A606. Color, 53 frames. Questions and answers are used to develop concepts of how man travels in space. $6. Accompanying 33⅓ rpm record, $4.95; test filmstrip in color, $4.95. Complete set, $14. (I)

JET ENGINES AND ROCKETS. #590. Color, 27 frames. Simple examples of equal and opposite reactions to a force of action. Relates these to the operation of jet and rocket engines. Shows how a jet engine differs from a rocket engine. $4.95. (U–S)

DESTINATION MOON. Color, 52 frames. Obstacles to be overcome to reach the moon. $6. (I)

SATELLITES STUDY SPACE. #A–609. Color, 51 frames. Shows how satellites gather facts from space. $6. Accompanying 33⅓ rpm record, $4.95; test filmstrip in color, $4.95. Complete set, $14. (I)

CONQUERING SPACE. #A–623. Color, 49 frames. Questions and answers are used in presenting a study of the role of jet engines and rockets in space. Discusses concepts and principles. $6. Accompanying 33⅓ rpm record, $4.95; test filmstrip in color, $4.95. Complete set, $14. (I)

Encyclopaedia Britannica Films, 1150 Wilmette Ave., Wilmette, Ill. 60091.

FLIGHT INTO SPACE. #8866. Color, 49 frames. An imaginary flight into space by rocket. Uses realistic Disney illustrations to describe preparations for the flight, the launching, climb, releasing of stages, orbiting the earth, the work of the crew while in orbit and the safe return to earth. $6. (U)

MAN IN SPACE. #8865. Color, 45 frames. Shows how man reacts to space travel. Describes stresses at launching, weightlessness, eating, drinking, and sleeping problems and moving about inside and outside the spacecraft. $6. (U)

②

FLIGHT AROUND THE MOON. #8867. Color, 50 frames. An imaginary flight around the moon in a manned rocket ship, beginning and ending at a space station. Work and reaction of crew are depicted. Closeup views of the moon are included. $6. (U)

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TRAVEL IN SPACE. #8086. Color, 49 frames. Explains in simple terms some of the problems involved in space travel. Presents a picture of the technical skills and training involved before man can fly in space. $6. (U)

Eye Gate House, Inc., 146-01 Archer Ave., Jamaica, N.Y., 11435

OUR SILVERY MOON. #88-C. Color, 29 frames. Facts about the moon showing its features and explaining that it is a satellite rather than a star. $5. (I-U)

COSMIC GLUE. #3-E. Color, 47 frames with record. Discusses gravity, Newton's and Einstein's theories, and explains that science today still does not know the cause of gravity. $8.50. (I-U)

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Filmstrip House, 432 Park Ave., South, New York, N.Y., 10016

HOW AN ASTRONAUT LIVES IN SPACE. Color, 32 frames. Explains how space differs from earth in temperature, pressure, and oxygen supply. Shows how an astronaut travels in a sealed spacecraft that provides earthlike conditions. $5. (P-I)

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HOW SPACE SCIENCE HELPS US. Color, 32 frames. Shows how space exploration contributes to our knowledge and leads to improvements in communications and weather forecasting, and to the development of new and better materials. $5. (P-I)

OUR SOLAR SYSTEM. Color, 29 frames. Emphasizes the redness of Mars, huge size of Jupiter, and life on Earth. Presents the solar system as the sun's family. $5. (P-I)

OUR MOON. Color, 28 frames. An imaginary trip to the moon emphasizing the moon's surface features, temperature extremes, degree of gravity, and its phases. $5. (P-I)

PLANETS, THE. Color, 31 frames. Relates the planets to the sun and the solar system to the galaxy. Gives facts about the planets and shows how earth differs from them. $5. (I-U)

MOON, THE. Color, 31 frames. Includes a map of the major features of the moon's surface and discusses the effects of the moon's gravitation. Demonstrates an eclipse of the moon. $5. (I-U)

International Screen Organization, 1445 18th Ave. North, St. Petersburg, Fla., 33704.

MOON, THE. Slides or strip of slides selected from the film "The Moon." Close-up telescope pictures of the moon including numerous features and areas that have been under investigation by the Ranger spacecraft. Single slides, 50¢; entire set of 20 2" x 2" slides, $8; single strip of 20 35 mm frames, $3.25. Write for descriptive folder. (U-S-A)

SOLAR SYSTEM, THE. Slides or strip of slides selected from the film "The Solar System". Includes telescopic and artists' views of the planets. Single slides, 50¢; entire set of 20 2" x 2" slides, $8; single strip of 20 35 mm frames, $3.25. Write for descriptive folder. (U–S–A)

Jam Handy Organization, 2821 East Grand Blvd., Detroit, Mich., 48211

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HOW WE LEARN ABOUT THE SKY. B/W, 51 frames. Contributions of the great astronomers. Shows modern astronomical instruments and contrasts today's scientific methods with those of the past. $4.95. (U)

SUN'S FAMILY, THE. B/W, 42 frames. Similarities and differences between the planets, meteors and comets of the solar system. $4.95. (U)

McGraw-Hill Text Films, 330 West 42d St., New York, N.Y., 10036

MAN IN THE UNIVERSE. Color, 46 frames. Shows how a solar system like ours is formed and examines the possibilities of life in other solar systems. $7.50. (U–S)

MARS. Color, 45 frames. Discusses conditions on Mars and possibility of life there. $7.50 (U–S)

MERCURY AND VENUS. Color, 40 frames. Compares these two planets with the earth as to size, revolution, temperature, atmosphere and possibility of life. Presents several methods of observation by which this information is obtained. $7.50. (U–S)

SPACE FLIGHT, PART II, HUMAN PROBLEMS. Color, 41 frames. Discusses weightlessness, g-forces, temperature extremes, radiation, and food, water and air during space flight. $6.75. (I)

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MOON: OUR EARTH'S NEAREST NEIGHBOR, THE. Color, 44 frames. Facts about the moon, why it seems to change shape and what man may find when he visits the moon. $6.50. (I)

EARTH'S SATELLITE—A MAN-MADE MOON. Color, 40 frames. Shows how satellites are placed in orbit. Discusses liquid and solid fuel rockets, how satellites are used, and re-entry problems. $7. (S)

EYES AND EARS. Color, 48 frames. Discusses optical and radio telescopes and their uses. $7.50. (U–S)

MOON, THE. Color, 72 frames. A summary of our knowledge of the moon up to the time of unmanned moon probes. $7.50. (U–S)

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National Aeronautics and Space Administration (to order, see addresses and instructions for ordering NASA films on pages 52–54).

ELECTRIC PROPULSION. #HQ 96. Color. 110 frames. Shows in nontechnical terms what electric propulsion is, how it works, why it is needed, its present status and program for development, and how it may be used for both manned and unmanned missions. Free loan. (S–A)

PROJECT APOLLO-MANNED FLIGHT TO THE MOON. #HQ 88. Color, 99 frames. Major steps in the project to place men on the moon and get them back to earth in safety. Shows principal features of the Gemini spacecraft, the Titan booster and the kinds of operations to be carried out under the Gemini project. Covers the complete sequence of events for the manned lunar landing, from earth launch to return. Free loan. (S–A)

Prentice Hall, Inc., Educational Book Division, Englewood Cliffs, N.J., 07632.

ASTRONOMY. Color, 31 frames. Illustrates the relationship between the earth and other members of our solar system. $5. (S)

Society for Visual Education, 1345 Diversey Parkway, Chicago, Ill., 60614

EARTH'S SATELLITE—THE MOON. #487–3. Color, 66 frames. Discusses the moon's phases and the effects of its gravity. $3.50. (I–U)

MOON AND ITS RELATION TO EARTH, THE. #409–5. Color, 60 frames. Why the moon has no atmosphere and facts about its size and distance from the earth. $6. Accompanying record, #409–RR3, (with reverse side for accompanying filmstrip #409–6—THE EARTH AND ITS MOVEMENTS). $3. (I–U)

SUN AND ITS FAMILY, THE. #427–15. Color, 46 frames. Considers planets, asteroids, comets, meteors, gravity, solar energy and other elements of the solar system. $6. (I–U)

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HOW MAN EXPLORES SPACE. #409–1. Color, 65 frames. Discusses orbital escape velocity, rockets and rocket stages, and components of a space capsule. $6. Accompanying record, #409–1RR, (with reverse side for accompanying filmstrip #409–2—OUR SOLAR SYSTEM). $3. (I–U)

EARTH'S NEAREST NEIGHBOR. #427–14. Color, 45 frames. The nature of the moon and its relationship to earth. Discusses physical conditions on the moon as related to requirements for maintaining human life. $6. (I–U)

WORK OF ASTRONOMERS, SPACE TRAVEL. #487–7. Color, 45 frames. Discusses observatories, satellites launched, and the future of space travel. $3.50. (I–U)

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SPACE TRAVEL A.D. 2000. #484–4. Color, 52 frames. Discusses the nature of space, facts of astronomy, relationship of time and distance to space travel and experimental propulsion systems—atomic engines and plasma and photon power. $6 (I–U)

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Stanbow Productions, 12 Cleveland St., Valhalla, New York

OUTER SPACE—THE NEW FRONTIER. B/W, 40 frames. Background of developments in space exploration and factors leading to the conquest of this new frontier. $3.50. (S)

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